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CATALOGUE

OF

SEA-PENS OR PENNATULARIIDÆ

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BY

J. E. GRAY, F.R.S. ETC.

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PREFACE.

THE object of the present Catalogue is to give a List of all the genera and species of the family of Sea-Pens, or Pennatulariidæ, known to exist in the collections of Europe and America. The letters B.M. after the specific names denote those species that are now contained in the Collection; and the absence of these letters indicates the species which are desiderata, and therefore desirable to be procured for the collection.

These sheets were printed in October 1868, and were retained to appear with the remainder of the Catalogue.

Since the above-mentioned period, two works have been published, viz.:—

RICHIARDI. Monografia della famiglia dei Pennatularii. 8vo. Bologna, 1869.

A. KÖLLIKER. Anatomisch-systematische Beschreibung der Alcyonarien. Erste Abtheilung: Die Pennatuliden. Frankfurt, 1870.

In the latter work, some genera here proposed have been established under other generic names.

This Catalogue is the commencement of a 'Catalogue of Polypes and their Corals,' of which it may be considered to be the First Part. The other Parts are in preparation.

J. E. GRAY.

British Museum,
April 2, 1870.

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CATALOGUE

OF

POLYPES AND THEIR CORALS.

Class POLYPES or CORALLIARIA.

Mouth central, surrounded by tentacles, without any distinct vent; tentacles tubular and placed in a circle, so as to communicate freely with the visceral cavity.

Body hollow, consisting of a single cavity, all the parts communicating with each other and with the exterior.

The organ of generation internal, and placed in the general cavity.

Marine.

Coralliaires, § 1. Cnidaires, *Milne-Edw. & Haime, Coralliaires*, i. p. 93.
Cnidaria or Polypi, *Verrill, Proc. Essex Institute*, 1865, p. 19.

The following arrangements have been proposed:—

M. de Blainville, article Zoophytes, Dict. Sci. Nat. lx. 1830, and Manuel d'Actinologie, 8vo, 1834, as follows:—

Classe III. Les Zoanthaires (*Zoantha*).

Fam. I. *Les Zoanthaires mous ou Actinies.*

Fam. II. *Les Zoanthaires coriacés*: Zoanthus &c.

Fam. III. *Les Zoanthaires pierreux* = Madrepora, *Linn.*: 1. Les Madréphyllies, 2. Les Uradrastres, 3. Les Madrépores.

Classe IV. Les Polypiaires.

Sous-classe 1. *P. pierreux.*

Sous-classe 2. *P. membraneux.*

Sous-classe 3. *P. douteux.*

Classe V. Les Zoophytaires.

Fam. I. *Les Tubipores* (Tubiporæa).

Fam. II. *Les Coraux* (Corallia).

Fam. III. *Les Pennatulaires* (Pennatularia).

Fam. IV. *Les Zoophytaires* (Alcyonaria).

Professor Ehrenberg, 'Die Corallenthiere des rothen Meeres,' Berlin, 1834:—

Circulus I. ANTHOZOA.

Order 1. Zoocorallia.

Tribe 1. ZOOCORALLIA POLYACTINIA.

Fam. I. Actinina. Gen. 1. *Actinia*, 2. *Metridium*, 3. *Megalactis*, 4. *Thalassianthus*, 5. *Cribrina*, 6. *Actinodendron*, 7. *Epicladia*, 8. *Heterodactyla*, 9. *Lucernaria.*

Fam. II. Zoanthina. 10. *Hughea*, 11. *Zoanthus*, 12. *Mammillifera*, 13. *Palythoa.*

Fam. III. Fungina. 14. *Fungia*, 15. *Haliglossa*, 16. *Polyphyllia*, 17. *Cyclolithus*, 18. *Turbinaria*, 19. *Trochopsis.*

Z. Dodecactinia (carent).

Tribe 2. Z. OCTACTINIA.

Fam. IV. Xenina. 20. *Xenia*, 21. *Anthelia*, 22. *Rhizoxenia.*

Fam. V. Tubiporina. 23. *Tubipora.*

Fam. VI. Halcyonina. 24. *Halcyonium*, 25. *Lobularia*, 26. *Ammothea*, 27. *Nephthya*, 28. *Sympodium*, 29. *Cliona.*

Fam. VII. Pennatulina. 30. *Veretillum*, 31. *Pavonaria*, 32. *Umbellularia*, 33. *Scirpearia*, 34. *Renilla*, 35. *Virgularia*, 36. *Pennatula.*

Tribe 3. Z. OLIGACTINIA.

Fam. VIII. Hydrina. 37. *Hydra*, 38. *Coryna.*

Fam. IX. Tubularina. 39. *Syncoryna*, 40. *Tubularia*, 41. *Eudendrium*, 42. *Pennaria.*

Fam. X. Sertularina. 43. *Sertularia.*

Order 2. Phytocorallia.

Tribe 4. PHYTOCORALLIA POLYACTINIA.

Fam. XI. Ocellina. 44. *Desmophyllum*, 45. *Cyathina*, 46. *Stephanocora*, 47. *Monomyces*, 48. *Oculina*, 49. *Turbinaria*, 50. *Explanaria*, 51. *Cladocora*, 52. *Columnaria*, 53. *Strombodes*, 54. *Cyathophyllum*, 55. *Pterorrhiza*, 56. *Anthophyllum*, 57. *Stylina.*

Fam. XII. Dædalina. 58. *Caryophyllia*, 59. *Favia*, 60. *Astræa*, 61. *Favosites*, 62. *Mæandra*, 63. *Manicina*, 64. *Merulina*, 65. *Pavonia*, 66. *Agaricia*, 67. *Polyastra*, 68. *Monticularia.*

Tribe 5. P. DODECACTINIA.

Fam. XIII. Madreporina. 69. *Heteropora*, 70. *Madrepora*, 71. *Catenipora*.

Fam. XIV. Milleporina. 72. *Calamopora*, 73. *Seriatopora*, 74. *Millepora*, 75. *Pocillopora*.

Tribe 6. P. OCTACTINIA.

Fam. XV. Isidea. 76. *Corallium*, 77. *Melitæa*, 78. *Mopsia*, 79. *Isis*.

Fam. XVI. Ceratocorallia s. Gorgonina. 80. *Prymnoa*, 81. *Muricea*, 82. *Unicea*, 83. *Plexaura*, 84. *Gorgonia*, 85. *Pterogorgia*.

Tribe 7. P. OLIGACTINIA.

Fam. XVII. Alloporina. 86. *Allopora*.

In the Synopsis of the British Museum for 1840 Dr. Gray gave the following arrangement (see p. 71) :—

Class IV. ZOOPHYTA.

Order 1. Zoantharia.

Fam. I. *Actiniadæ*. 1. Actinia, 2. Anthea, 3. Metridium, 4. Megalactis, 5. Actinodendron, 6. Epicladia, 7. Heterodactyla, 8. Lucernaria.

Fam. II. *Zoanthidæ*. 1. Isaura, 2. Hughæa, 3. Zoanthus, 4. Mammillifera, 5. Corticifera.

Fam. III. *Madreporidæ*. 1. Fungia, 2. Turbinolia, 3. Diploctenium, 4. Cyclolithes, 5. Desmophyllum, 6. Cyathina, 7. Caryophyllia, 8. Manicina, 9. Oculina, 10. Stephanocora, 11. Cladocora, 12. Columnaria, 13. Strombodes, 14. Cyathophyllum, 15. Pterorrhiza, 16. Anthophyllum, 17. Stylina, 18. Favia, 19. Astræa, 20. Dictyophyllia, 21. Favosites, 22. Monticularia, 23. Meandra, 24. Dendrogyra, 25. Turbinaria, 26. Explanaria, 27. Merulina, 28. Pavonia, 29. Agaricina, 30. Polyastra, 31. Haliglossa, 32. Polyphyllia.

Fam. IV. *Poritidæ*. 1. Madrepora, 2. Porites, 3. Alloporina.

Fam. V. *Pocilloporidæ*. 1. Seriatopora, 2. Anthopora, 3. Pocillopora, 4. Heliopora.

Fam. VI. *Milleporidæ*. 1. Millepora.

Fam. VII. *Distichoporidæ*. 1. Distichopora.

Order 2. Zoophytaria.

Fam. I. *Cornulariadæ*. 1. Cornularia.

Fam. II. *Clavulariadæ*. 1. Actinantha, 2. Clavularia, 3. Telesto.

Fam. III. *Tubiporidæ*. 1. Tubipora.

Fam. IV. *Coralliadæ*. 1. Corallium, 2. Isis, 3. Mopsea, 4. Melitæa, 5. Prymnoa, 6. Muricea, 7. Scirpearia, 8. Eunicea, 9. Plexaura, 10. Gorgonia, 11. Pterogorgia.

Fam. V. *Antipathidæ*. 1. Antipathes, 2. Leiopathes.

Fam. VI. *Briareidæ*. 1. Briareum.

Fam. VII. *Lobulariadæ*. 1. Lobularia, 2. Ammothæa, 3. Anthelia, 4. Sympodium, 5. Rhizoxenia.

Fam. VIII. *Zeniadæ*. 1. Zenia, 2. Nephthya, 3. Nidalia.

Fam. IX. *Hyalonemidæ*. 1. Hyalonema.

Fam. X. *Pennatulidæ*. 1. Pennatula, 2. Virgularia, 3. Renilla, 4. Pavonaria, 5. Veretillum.

Fam. XI. *Umbellariadæ*. 1. Umbellaria.

J. D. Dana, "On Zoophytes," 1846, divides them thus:—

ZOOPHYTES.

Order 1. ACTINOIDEA.

Suborder 1. Actinaria.

Tribe 1. Astreaceæ. Fam. 1. *Asteriadæ*, 2. *Astræidæ*, 3. *Fungidæ*, appending *Astræacea*.

Tribe 2. Caryophyllaceæ. Fam. 1. *Cyathophyllidæ*, 2. *Caryophyllidæ*, 3. *Gemmiporidæ*, 4. *Zoanthidæ*.

Tribe 3. Madreporidæ. Fam. 1. *Madreporidæ*, 2. *Favositidæ*, 3. *Poritidæ*, appending *Madreporacea*.

Tribe 4. Antipathacea.

Suborder 2. Alcyonaria.

Fam. 1. *Pennatulidæ*, 2. *Alcyonidæ*, 3. *Cornulariдæ*. 4. *Tubiporidæ*, 5. *Gorgonidæ*.

Order 2. HYDROIDEA.

Fam. 1. *Hydridæ*, 2. *Sertularidæ*, 3. *Campanularidæ*, 4. *Tubularidæ*.

MM. Milne-Edwards and Haime, in Hist. Nat. des Coralliaires, 1857, proposed the following system:—

Ordre 1. ALCYONAIRES.

Fam. I. Alcyonides. Sous-fam. Cornulaires. 1. Haimeia. 2. Cornularia. 3. Clavularia, 4. Rhizoxenia, 5. Sarcodictyon, 6. Anthelia, 7. Sympodium. Sous-fam. Telestines. 8. Telesto. Sous-fam. Alcyoniens. * *Alcyoniens nus*: 9. Alcyonium, 10. Sarcophyton. 11. Xenia. 12. Ammothea. ** *Alcyoniens armés*: 13. Nephthya, 14. Spoggodes, 15. Paralcyonium. Sous-fam. Tubiporiens. 16. Tubipora.

Fam. II. Gorgonides. Sous-fam. Gorgoniens. * *Primnoacées*: 1. Primnoa, 2. Muricea. ** *Gorgoniacées*: 3. Eunicea, 4. Plexaura, 5. Gorgonia, 6. Leptogorgia, 7. Lophogorgia, 8. Pterogorgia, 9. Xiphigorgia, 10. Phyllogorgia, 11. Hymenogorgia, 12. Phycogorgia. *** *Gorgonellacées*: 13. Gorgonella, 14. Verrucella, 15. Ctenocella, 16. Juncella. **** *Briareacées*: 17. Briareum, 18. Solanderia, 19. Paragorgia, 20. Cœlogorgia. Sous-fam. Isidiens. 21. Isis, 22. Mopsea, 23. Melithæa. Sous-fam. Coralliens. 24. Corallium.

Fam. III. Pennatulides. 1. Pennatula, 2. Sarcoptylus. 3. Virgularia, 4. Pavonaria, 5. Umbellularia, 6. Lituaria, 7. Veretillum, 8. Cavernularia. 9. Renilla.

Ordre 2. ZOANTHAIRES.

Sous-ordre 1. Zoanthaires malacodermes ou Actinaires.

Fam. I. Actinides. Sous-fam. Myniadiniens. 1. Mynias, 2. Plocactis, 3. Nautactis. Sous-fam. Actiniæ. * *A. vulgaires*: 1. Anemonea, 2. Comactis, 3. Eumenides, 4. Ceratactis, 5. Actinia, 6. Paractis, 7. Metridium, 8. Discosoma, 9. Coryactis, 10. Melactis, 11. Heteractis, 12. Capnea, 13. Dysactis. ** *A. verruqueuses*: 14. Cereus, 15. Phymactis, 16. Cystiactis, 17. Echinactis. *** *A. perforées*: 18. Adamsia, 19. Nemactis. **** *A. pivotantes*: 20. Iluanthos, 21. Edwardsia, 22. Sphenopus, 23. Peachia. Sous-fam. Phyllactiniens. 1. Phyllactis, 2. Oulactis, 3. Rhodactis. Sous-fam. Thalassianthiniens. 1. Thalassianthus, 2. Actinodendron, 3. Actineria, 4. Phymanthus, 5. Sarcophinanthus, 6. Heterodactyla. Sous-fam. Zoanthiniens. 1. Zoanthus, 2. Palythoa.

Fam. II. Cérianthides. 1. Cerianthus, 2. Saccanthus.

Sous-ordre 2. ZOANTHAIRES SCLEROBLASTIQUES ou ANTIPATHAIRES.

1. Cirripathes, 2. Antipathes, 3. Arachnopathes, 4. Rhipidipathes, 5. Leiopathes, 6. Hyalopathes.

Dr. Gray published an arrangement of the Zoophytes with pinnated tentacles, in Ann. & Mag. Nat. Hist. 1859, iv. p. 439:—

Order I. SABULICOLÆ.

Fam. 1. PENNATULIDÆ. I. *Penniformes.* Tribe 1. *Funiculineæ.* Funiculina, Virgularia, Lygus, Scytalium. Tribe 2. *Pennatuleæ.* *Pennatula, **Sarcoptilus, Pteromorpha, Pteroeides. II. *Claviformes.* Tribe 3. *Kophobelemnonieæ.* Kophobelemnon. Tribe 4. *Veretilleæ.* Lituaria, Sarcobelemnon, Cavernularia, Veretillum. Tribe 5. *Renilleæ.* Renilla.

Fam. 2. UMBELLULARIADÆ. Umbellularia.

Order II. SPONGICOLÆ or HYALOPHYTA.

Fam. 1. HYALONEMIDÆ. Hyalonema.

Order III. RUPICOLÆ.

Suborder 1. LITHOPHYTA.

Fam. 1. CORALLIADÆ. *Corallium, Annella, Ellisella, (Junceella and Ctenocella,) ? Gorgonella, Scirpearia, Umbracella, **Subergorgia.

Fam. 2. PRIMNOADÆ. Primnoa, Callogorgia, Primnoella.

Fam. 3. MELITÆADÆ. Melitæa, Mopsella, ? Solanderia.

Fam. 4. ISIDEÆ. Isis (Cynosaire), Isidella, Mopsea.

Suborder 2. CERATOPHYTA.

Fam. 1. GORGONIADÆ. *Gorgonia, Pterogorgia, Rhipidogorgia, **Hymenogorgia, Phyllogorgia, Phycogorgia.

Fam. 2. PLEXAURIDÆ. Plexaura, Rhinogorgia, Eunicea, Gonidora.

Fam. 3. MURICEIDÆ. Muricea, Plocmus ?

Fam. 4. ACANTHOGORGIADÆ. Acanthogorgia.

? Fam. 5. ANTIPATHIDÆ. Leiopathes, Antipathes.

Fam. 6. SARCOGORGIADÆ. Sarcogorgia.

Suborder 3. SARCOPHYTA.

Fam. 1. BRIAREIDÆ. Briareum.

Fam. 2. ALCYONIADÆ. Alcyonium (Lobularia), Sympodium, Ammothea.

Fam. 3. XENIADÆ. *Xenia, Anthelia, Rhizoxenia, Evagora, **Cornularia.

Fam. 4. NEPHTHYADÆ. *Nephthya (Spoggodia), ?Alcyonidia, **Nidalia, ***Clavularia.

Fam. 5. TUBIPORIDÆ. Tubipora.

Professor A. E. Verrill, in the Proc. Essex Institute for 1865, and Ann. & Mag. Nat. Hist. 1865, xvi. p. 191, proposes the following classification:—

Class *CNIDARIA* or *POLYPI.*

Order I. MADREPORARIA.

Suborder 1. STAURACEA (*Madreporaria rugosa*).

Fam. Stauridæ, Cyathophyllidæ, Cyathaxonidæ, Cystiphyllidæ.

Suborder 2. FUNGACEA.

Fam. Cyclolitidæ, Lophoseridæ, Fungidæ, Merulinidæ.

Suborder 3. ASTREACEA.

Fam. Lithophyllidæ, Meandrinidæ, Eusmiliidæ, Caryophyllidæ, Stylinidæ, Astreinæ, Oculinidæ, and Stylophoridæ.

Suborder 4. MADREPORACEA (*Madreporaria perforata*).

Fam. Eupsammidæ, Gemmiporidæ, Poritidæ, Madreporidæ.

Order II. ACTINARIA.

Suborder 1. ZOANTHACEA.

Fam. Zoanthidæ, Bergidæ.

Suborder 2. ANTIPATHACEA.

Fam. Antipathidæ, Gerardidæ.

Suborder 3. ACTINACEA.

Fam. Actinidæ, Thalassianthidæ, Minyidæ, Ilyanthidæ, Cerianthidæ.

Order III. ALCYONARIA.

Suborder 1. ALCYONACEA.

Fam. Alcyonidæ, Xenidæ, Cornularidæ, Tubiporidæ.

Suborder 2. GORGONACEA.

Fam. Gorgonidæ, Plexauridæ, Primnoidæ, Gorgonellidæ, Isidæ, Corallidæ, Briaridæ.

Suborder 3. PENNATULACEA.

Fam. Pennatulidæ, Pavonaridæ, Veretillidæ, Renillidæ.

Kölliker (Icones Histiologicæ, 1866, p. 131) proposes the following arrangement of *Alcyonaria*:—

Family I. ALCYONIDÆ (M.-E.). Subfam. 1. CORNULARIADÆ (M.-E.). Genera:—1. *Clavularia* (Q. & G.), 2. *Anthelia* (Sav.), 3. *Rhizoxenia* (Ehr.). Subfam. 2. ALCYONINÆ. Genera:—1. *Alcyonium* (L.), 2. *Ammothea* (Sav.), 3. *Xenia* (Sav.), 4. *Nephthya* (Sav.), 5. *Spongodes* (Less.).

Family II. PENNATULIDÆ (M.-E.). Genera:—1. *Funiculina* (Lam.). 2. *Pennatula* (L.), 3. *Pteroeides* (Herkl.), 4. *Veretillum* (Cuv.), 5. *Cavernularia* (Val.), 6. *Renilla* (Lam.).

Family III. GORGONIDÆ (M.-E.). Subfam. 1. GORGONINÆ (M.-E.). A. *Primnoaceæ* (Val.). Genera:—1. *Primnoa* (Lamx.), 2. *Muricea* (Lamx.), 3. *Echinogorgia* (n. g.). 4. *Paramuricea* (Köll.), 5. *Acis* (Duch. & Mich.), 6. *Thesea* (Duch. & Mich.), 7. *Behryce* (Phil.). B. *Eunicidæ* (Köll.). Genera:—1. *Eunicea* (Lamx.), 2. *Plexaura* (Lam.), 3. *Plexaurella* (Köll.). C. *Gorgonaceæ* (M.-E.). Genus *Gorgonia*. D. *Gorgonellaceæ* (Val.). Genera:—1. *Gorgonella*, 2. *Juncella*, 3. *Verrucella*, 4. *Rusea* (Duch. & Mich.). Subfam. 2. ISIDINÆ. Genus *Isis*. Subfam. 3. BRIAREACEÆ (M.-E.). Genera:—1. *Paragorgia* (M.-E.), 2. *Sympodium* (Ehr.), 3. *Erythropodium* (Köll.), 4. *Briareum* (Bl.), 5. *Solanderia* (Duch. & Mich.). Subfam. 4. SCLEROGORGIACEÆ (Köll.). Genus *Sclerogorgia* (Köll.) = *Suberogorgia* (Gray). Subfam. 5. MELITHÆACEÆ. Genera:—1. *Melithæa*, 2. *Mopsea*. Subfam. 6. CORALLINÆ (M.-E.). Genus *Corallium* (Lam.).

Synopsis of Orders.

I. *Tentacles* 8 (*very rarely* 6), *pinnate, with tubercles on each side.*

1. ZOOPHYTARIA.

II. *Tentacles* 6 *or* 12, *simple, conical.*

2. ANTIPATHARIA.

III. *Tentacles* 20 *or more.*

3. HYALOCHÆTARIA. Polypes social, forming a bark, supported by an axis formed of elongated siliceous spicules.

4. ZOANTHARIA. Polypes social, covered with a hard often granular skin, covering some marine bodies, without an axis.

5. ACTINARIA. Polypes separate or social, covered with a soft skin, rarely secreting a horny tubular sheath at the base.

6. MADREPORARIA. Polypes social; the integument, becoming solidified by the deposit of calcareous matter, forming a true coral.

The following papers, among others, refer to the specimens of this Class in the British Museum:—

GRAY, J. E. Animal of *Antipathes*, P. Z. S. 1832, p. 41.

——. New genus of Corals (*Nidalia*), P. Z. S. 1835, p. 59; Weigm. Arch. 1836, ii. p. 195.

——. On the Coral known as the Glass Plant (*Hyalonema*), P. Z. S. 1835, p. 63.

——. *Sarcoptilus*, a new genus of Pennatulidæ, P. Z. S. 1848, p. 45; Ann. & Mag. Nat. Hist. 1849, p. 76.

——. New species of *Gorgonia* from Australia, P. Z. S. 1849, p. 146; Ann. & Mag. Nat. Hist. 1850, p. 510; Proc. Roy. Soc. 1852, ii. p. 193.

——. New genus of Gorgoniadæ, P. Z. S. 1851, p. 124.

——. On the Animal and Bark of *Antipathes*, P. Z. S. 1857, p. 113; Ann. & Mag. Nat. Hist. 1857, xx. p. 460.

——. New genus of Gorgoniadæ (*Acanthogorgia*), P. Z. S. 1857, pp. 128, 158; Ann. & Mag. Nat. Hist. 1857, xx. 461.

——. Synopsis of the families and genera of Axiferous Zoophytes or Barked Corals, P. Z. S. 1857, p. 278.

——. Description of some new genera of Lithophytes or Stony Corals, P. Z. S. 1859, p. 479.

——. Description of *Corallium Johnsoni* from Madeira, P. Z. S. 1860, p. 393.

——. Arrangement of Zoophytes with pinnated tentacles, Ann. & Mag. Nat. Hist. 1859, iv. p. 439.

GRAY, J. E. Revision of Pennatulidæ, Ann. & Mag. Nat. Hist. 1860, v. p. 20.

——. A second species of *Paragorgia*, Ann. & Mag. Nat. Hist. 1862, x. p. 125.

——. New species of *Spoggodes* and of a new allied genus (*Morchellana*), P. Z. S. 1862, p. 27; Ann. & Mag. Nat. Hist. 1862, x. p. 69.

——. Specimens of Claviform Pennatulidæ in British Museum, P. Z. S. 1862, p. 31; Ann. & Mag. Nat. Hist. 1862, x. p. 73.

——. A *Paragorgia* from Madeira, Ann. & Mag. Nat. Hist. 1862, x. p. 125.

——. New genera of Zoophytes, *Solenocaulon* and *Bellonella*, P. Z. S. 1862, p. 34; Ann. & Mag. Nat. Hist. 1862, x. p. 147.

——. *Rhodophyton*, a new genus of Alcyoniadæ, P. Z. S. 1865, p. 705.

——. Two new forms of Gorgonioid Corals, P. Z. S. 1866, p. 24.

JOHNSON, J. Y. A second species of *Acanthogorgia* from Madeira, P. Z. S. 1861, p. 296; Ann. & Mag. Nat. Hist. 1862, ix. p. 75.

——. Two Corals (*Acanthogorgia atlantica* and *Allopora maderensis*) from Madeira, P. Z. S. 1862, p. 194; Ann. & Mag. Nat. Hist. 1863, xi. p. 140.

——. Two Corals (*Primnoa imbricata* and *Mopsea arbusculum*) from Madeira, P. Z. S. 1862, p. 245; Ann. & Mag. Nat. Hist. 1863, xi. p. 299.

——. On *Juncella flagellum*, P. Z. S. 1863, p. 505.

I. *Tentacles* 8 (*rarely* 6), *pinnate, with tubercles on each side.*

Order I. ZOOPHYTARIA.

Tentacles 8, regularly pinnate, on the edge, arising from each of the eight nearly equal hollow elongate cells or spheromeres (arranged on a vertical axis) of which the cylindrical body of the polype is composed. These spheromeres are, side by side, closely united to each other, without the interposition of interambulacral spaces.

Zoophytaria, *Blainv. Man. d'Act.* p. 496; *Gray, Syn. B. M.* 1840.
Alcyonaria, *Dana, Zoophytes U. States Exped.* 1846, pp. 45, 117, 586; *Verrill, Proc. Essex Inst.* 1865, p. 148.
Alcyonaria (Des Alcyonaires), *Milne-Edw. & Haime, Coral.* i. p. 96.
Zoophytes with pinnate tentacles, *Gray, Ann. & Mag. Nat. Hist.* 1859, iv. p. 439.

Synopsis of Suborders and Sections.

Suborder I. **Sabulicolæ.** Coral living with the stem sunk in the sand or mud at the bottom of the ocean, of a definite form, which when once attained remains unaltered.

1. Pennatularia. Coral pen-shaped or clavate.
2. Umbellularia. Coral radiate, with a stem.

Suborder II. **Rupicolæ.** Coral tree-like or massive, living attached by the expanded base to marine bodies, gradually growing and increasing in size the whole term of its existence.

I. *Polypes social, growing closely side by side, forming a fleshy crust, the polypes being developed in the centre of the crust, or at the ends of the branches.*

1. Axifera. The social polypes forming a more or less cylindrical or branched coral, supported by a calcareous horny or corky axis, which is separated from the crust by the lower part of the body of the polypes.
2. Carnosa. The social polypes forming a crust, or spread out on marine bodies, and extended into rounded lobes, the inner surface being tubular or cellular, without any hard axis.

II. *Polypes social, separate, growing from creeping stolons at the root or the coral-plate.*

1. Sarmentosa. Skin of the polypes and stolons at the base developed into a cartilaginous horny or calcareous sheath for the polypes.
2. Placophora. Skin of the polypes gradually converted into hard cellular calcareous tubes, which are united by horizontal laminæ, on which the new polypes are developed.

Suborder I. SABULICOLÆ.

Coral-tree symmetrical, of a definite form, which when once reached remains unaltered, with a simple base, with a central stem with longitudinal cavities, and supported by more or less distinct calcareous spicules, and often strengthened by a single fusiform, elongate, calcareous central axis, living with the base sunk in the sand or mud of the sea-coast.

Polypes forming free marine colonies; the composite basal portion with locomotive powers and special cavities, with or without a solid free axis.

Polypiers nageurs, *Cuvier, R. A.* ed. 2. pp. 111, 317.
Sabulicolæ, *Gray, Ann. & Mag. Nat. Hist.* 1859, iv. p. 439.
Calamides, *Latr. Fam. R. A.* 1825, p. 341.
Pennatulidæ (Pennatulides), *Milne-Edw. & Haime, Corall.* i. pp. 102, 206.
Pennatulaceæ, *Verrill, Proc. Essex Inst.* 1865, pp. 149, 181.

Section I. *Pennatularia.*

Body free, more or less pen-like, with a naked peduncle and a single central axis. The upper part with polypes placed in transverse series on one, sometimes on all sides. Axis fusiform, elongate, cylindrical or quadrangular, calcareous, as long as the coral.

Pennatulidæ (part.), *Milne-Edw. & Haime, Coral.* p. 206.
Pennatulidæ, *Gray, Ann. & Mag. Nat. Hist.* 1859, p. 439, 1860, v. p. 20.

"The polypes of Pennatulidæ are united into communities, which are unattached and capable of voluntary locomotion (?). The polypes are regularly arranged at the upper part of a structure which contains special ducts and a central cavity, sometimes subdivided or enclosing a solid axis attached to the wall by muscular fibres. The lower extremity is bulbular and capable of expansion and contraction, by means of a well-developed common muscular action."—*Verrill, Mem. Boston Soc. N. H.* 1862, i. p. 2.

See "Revision of the family Pennatulidæ, with Descriptions of some new Species in the British Museum," by Dr. J. E. Gray (Ann. & Mag. Nat. Hist. 1860, v. p. 20).

"Notes on some specimens of Claviform Pennatulidæ (Veretillæ) in the British Museum" (Ann. & Mag. Nat. Hist. 1862, x. p. 73).

J. A. Herklotz, 'Notices sur les Polypiers Nageurs,' 4to.

Synopsis of Families.

Subsection I. **Penniformes.** The coral pen-shaped. The polypes in transverse ridges or pinnules on each side of the ventral surface of the central rachis or stem.

Fam. 1. FUNICULINIDÆ or JUNCIFORMES. Coral elongate, linear, slender. Polypes placed in transverse ridges on each side of the front of the rachis.

a. Ridge of polype-cells attached the whole length.

* Cells armed with spicules. *Funiculina, Balticina, Norticina, Scytalium.*

** Cells not armed. *Virgularia.*

b. Ridge with a narrow base. *Lygus, Stylatula.*

Fam. 2. PENNATULIDÆ or PENNIFERA. Coral pinnate. Pinnules arising from a narrow base, in a series on each side of the front part of the rachis. Polypes retractile.

a. Pinnules elongate, angular. *Pennatula, Phosphorella, Ptilella, Lisella, Leioptilus, Argentella, Pteromorpha, Pteroeides.*

b. Pinnules square, fleshy. *Crispella.*

c. Pinnules semicircular, fleshy. *Sarcoptilus, Philosarcus.*

Subsection II. **Claviformes.** The coral club-shaped or leaf-like. The polypes scattered on one or on all sides of the upper part of the club.

Fam. 3. KOPHOBELEMNONIDÆ or CLAVIFORMES. The coral club-shaped, with an irregular row of polypes only on one surface of the club, the other surface sterile. Polypes not retractile. *Kophobelemnon.*

Fam. 4. VERETILLIDÆ or VERETILLOIDS. The coral club-shaped. The polypes on all sides of the club. Polypes retractile, expanded. *Lituaria, Sarcobelemnon, Cavernularia, Veretillum.*

Fam. 5. RENILLIDÆ. The coral expanded, foliaceous, with a slender stalk. The polypes only on one surface of the expanded disk, not retractile. *Renilla, Herklotsia, Renillina.*

Subsection I. PENNIFORMES.

Coral pen-shaped. Polypes in transverse ridges or pinnules, placed on each side of the upper part of the ventral surface of the central stem.

Fam. 1. FUNICULINIDÆ or JUNCIFORMES.

Coral elongate, linear, slender. Polypes retractile or non-retractile, placed in transverse ridges on each side of the front of the rachis.

Funiculineæ, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20.

a. *Ridge of polype-cells attached the whole length.*

* *Rachis quadrangular or compressed; cells spiculose.*

1. FUNICULINA.

Coral free, linear, elongate, rather flattened; base subclavate, sterile. Front surface broad, covered with very close transverse rows of polypes, which are so close as to imbricate one with the other. Cells spiculose. Polypes 5 in each row, cylindrical, elongate, not retractile; tentacles short, retractile. Axis calcareous, elongate, as long as the coral, quadrangular.

Funiculina, *Lamk. An. s. V.* i.; *Herklotz, Notices*, 1859, p. 8; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20; *Kölliker, Ic. Hist.* p. 134.
Scirpearia, *Cuvier, R. A.* iv. p. 85, ed. 2. iv.
Pavonaria, *Cuvier, R. A.* iv. p. 85, ed. 2. iv.; *Dana, Zooph.* p. 597; *Edw. & Haime, Coral.* i. p. 214.

Ellis, Lamarck, and Cuvier describe the polypes as arranged in different manners.

1. Funiculina quadrangularis. B.M.

Series of polypes broad and crowded.

Penna del pesce pavone, *Bohadsch, An. Mar.* p. 112 (copied *Ellis, Phil. Trans.* liii. p. 426, and *Blainville, l. c.* t. 90. f. 1).
Pennatula quadrangularis, *Pallas, Zooph.* p. 372. n. 219.
Pennatula antennina, *Linn. S. N.* p. 350. n. 7; *Ellis & Solander, Zooph.* p. 63.
Funiculina tetragona, *Lamk. An. s. V.* ii. p. 423, ed. 2. ii. p. 641.
Pavonaria antennina, *Cuvier, R. A.* ed. 2. iii. p. 319; *Schweigger, Handb.* p. 435; *Ehrenb. Corall. d. r. M.* p. 31.
Pavonaria quadrangularis (axis and spicula), *Quekett, Lectures, Hist.* p. 137, f. 71.
Pavonaria quadrangularis, *Blainv. Man. d'Act.* p. 516, t. 90. f. 1 (cop. *Bohadsch*); *Dana, Zooph.* p. 597; *Edw. & Haime, Corall.* i. p. 215.
Funiculina antennina, *Hoeven, Handb.* ed. 2. i. p. 101.

Hab. North Sea: in spirits (Stockholm Museum).

2. Funiculina Forbesii. B.M.

The polype-cells in short transverse series; the rachis quadrangular, large.

Funiculina Forbesii, *Verrill, Proc. Mus. Comp. Zool.*
Pavonaria quadrangularis, *Johnston, Brit. Zooph.* p. 104, f. 31.

Funiculina quadrangularis, *Herklotz, Not.* p. 8; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20; *Kölliker, Ic. Hist.* pp. 134, 160, f. 27, 28.

Hab. Oban (*MacAndrew*).

Mr. Verrill first pointed out that the Scottish specimens are different from those from Norway.

3. Funiculina philippinensis. B.M.

Axis quadrangular, about a foot long.
Hab. Philippines (*Cuming*).

2. BALTICINA.

Coral free, linear, elongate, subquadrangular; base sterile, elongate, clavate; front of upper part shelving on each side of a narrow, rather sunken, medial groove, hinder sides rounded. Polype and tentacles quite retractile. Cells (when retracted) conical, separate, isolated, in irregular, oblique, converging lines of 10 or 12, and some few isolated among the series. Axis calcareous, elongate, as long as the coral, "cylindrical."

Funiculina, sp., *Sars.*

4. Balticina finmarchica. B.M.

Virgularia finmarchica, *Sars, Faune Lit. Norv.* ii. p. 68, t. 11; *Milne-Edw. & Haime, Corall.* i. p. 213.
Funiculina finmarchica, *Herklotz, Not.* p. 9; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20; *Kölliker, Ic. Hist.* p. 134.

Hab. Finmark.

3. NORTICINA.

Coral free, linear, elongate, compressed; base sterile, largely clavate; upper part much compressed, with a narrow, rounded back edge; the sides compressed, converging and narrower in front. Polypes completely retractile. Cells (five in each series) conical, close together, regularly placed in narrow, rounded, subangular, transverse fleshy ridges. Spicules dark at the top. Axis calcareous, elongate, as long as the coral, cylindrical.

Virgularia, sp., *Koren.*
Funiculina, sp., *Herklotz.*

5. Norticina Christii. B.M.

Virgularia Christii, *Koren & Danielssen in Sars, Faune Littor. Norv.* ii. p. 91, t. 12. f. 7, 12; *Milne-Edwards & Haime, Corall.* i. p. 213.
Funiculina Christii, *Herklotz, Not.* p. 9; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20; *Kölliker, Ic. Hist.* p. 134.

Hab. Coast of Norway.

See 1. *Pennatulata arundinacea*, Gmelin, S. N. p. 3866; Modeer, N. Act. Stockh. 1786, p. 14. n. 5. chap. 28.

Funiculina arundinacea, *Blainv. Man. d'Act.* p. 508.

2. *Pennatula scirpea*, Pallas, Zooph. p. 372. n. 218. "*P.* simplex,

linearis, adtenuata, rachi tereti; altera latera polypifera. Stipes carnosus, crassior, teres. Rachis stipite multò longior, adtenuata; altera latera polypis confertissimis paleaceis obsita. Ossiculum intus teres, lineari-adtenuatum, subflexum. Longitudine sesquipedali siccata extat in Museo Dom. *Petri Cramer Anstelodamensis.*"

Pavonaria scirpea, Cuvier, R. A. ed. 2. iii. p. 319, is described as being cylindrical, with the polypes placed on one side.

This has been referred to the genus *Pavonaria* by Cuvier (Règ. Anim. ed. 2. iii. p. 319) and Blainville (Man. d'Act. p. 516). No specimens agreeing with the description have been found in Museums, and the species is doubtful (see Herklotz, Not. p. 11).

See fossil *Pavonaria Delanovii*, Milne-Edwards & Haime, Coral. i. p. 215.

4. SCYTALIUM.

Coral free, linear, elongate; base elongate, vermiform; above quadrangular; sides and hinder part bare; two series of small, elongate, triangular lobes, placed obtusely on the sides of the front of the axis, so as to be nearly parallel with the axis. Axis quadrangular, thin. Polypes retractile.

Scytalium, *Herklotz, Not.* p. 74; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.

6. Scytalium Sarsii.

Scytalium Sarsii, *Herklotz, Not.* p. 14, t. 7. f. 6; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.

Hab. North Sea (Mus. Leyden).

** *Rachis cylindrical; cells fleshy, not spiculose.*

5. VIRGULARIA.

Coral free, linear, elongate, cylindrical. Rachis with the polypes placed in two lateral diverging series, leaving a part of the front and hinder part of the body of the axis free. Cells not produced, and without spicules, adpressed, nearly at right angles with the axis. Axis cylindrical, fusiform, rather stony, elongate, as long as the rachis, tapering at each end.

Virgularia, *Lamk. A. s. V.* ii. p. 429; *Herklotz, Not.* p. 11; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20.

MM. Milne-Edwards and Haime observe that this little genus, established by Lamarck, only differs from *Pennatula* by the development of the rachis and the shortness of the pinnules (Corall. i. p. 112).

7. Virgularia juncea. B.M.

Coral fusiform, elongate, very thin; base vermiform, elongate, rather swollen; feather narrowed above.

Sagitta marina, *Rumph, Amb.* vi. p. 256.

Pennatula juncea, *Pallas, Zooph.* p. 371. n. 217; *Esper, Pflanzenth.* iii. p. 87, t. 14.

Virgularia juncea, *Lamk. A. s. V.* ii. p. 431, ed. 2. ii. p. 648; *Schweig. Beob.* p. 26, t. 2. f. 12; *Cuvier, R. A.* ed. 2. iii. p. 318; *Ehrenb. Corall. r. M.* p. 35; *Blainv. Man. d'Act.* p. 514, t. 90. f. 13; *Dana, Zooph.* p. 592, not description; *Herklotz, Not.* p. 12.

? Virgularia australis, *Blainv. Man. d'Act.* p. 314 (vide *Milne-Edw.*).

Hab. Shores of Molucca and Borneo (Mus. Leyden).

Cuvier considers that the *Virgularia australis* of Lamk. H. N. A. s. V. ii. p. 432, does not differ from *V. juncea* (see Règ. Anim. ii. p. 83). MM. Milne-Edwards and Haime observe that the stylet figured by Seba (Thes. iii. t. 114. f. 2) is artificially sunk in a fragment of stony matter (Corall. i. p. 21).

8. Virgularia Reinwardtii. B.M.

Body elongate, fusiform; base swollen. The pinnules in series nearly at right angles with the axis of the stem; the lower ones far apart on the sides of the stem; the upper ones close together in front. Axis round.

Virgularia Reinwardtii, *Herklotz, Not.* p. 13, t. 7. f. 8.

Hab. Indian Seas (Mus. Leyden, *Reinwardt*); Amboina and Ceram (B.M.).

9. Virgularia elegans. B.M.

Coral dark green; the polypes rather irregular, crowded, in well-marked concentric ridges; the axis stony, cylindrical, smooth.

Hab. Australia, Shark's Bay (*Mr. Rayner*, 1859).

Var. *hexangularis*. The axis with six acute angular ridges. A fragment with the other specimens, which are frequent.

See *V. australis*, Lamk. A. s. V. ii. p. 648, from an axis only (from Australia?).

10. Virgularia philippinensis. B.M.

Hab. Philippines (*Cuming*), axis only.

In the British Museum there are axes of two *Pennatularia*, probably *Virgulariæ*:—

1. Philippines (*Cuming*).
2. North Australia (*Jukes*).

11. Virgularia pusilla.

Virgularia pusilla, *Verrill, Proc. Essex Inst.* 1865, iv. p. 184, t. 5. f. 2 (animal).

"Coral small, slender, the pinnæ extending nearly to the base, which is rounded and bulbous. Pinnæ of the upper portion surrounding the stalk on all sides except the back, which is naked; below they are separated also by a narrow anterior space; but the pinnæ of the opposite sides appear to coalesce anteriorly higher up, producing

a subverticillate arrangement. The inside whorls are separated about one-tenth of an inch. Polypes small, 12 or 14, in the median whorls somewhat crowded. Tentacles slender, elongate, with slender, rather distant lateral lobes along nearly their whole extent.

"Length 1¾ inch, diameter in the middle rather more than one-tenth of an inch."—*Verrill, l. c.*

Hab. China Bay, opposite Hong-Kong, in mud at 6 fathoms, 1864. Colour pale orange, or dark red when alive (*Stimpson*). A single specimen, probably young.

12. Virgularia gracilis.

Virgularia gracilis, *Gabb, Proc. California Acad. Nat. Sci.* 1864, p. 120.

"Polypidom long and very slender, decorticated; stem circular or elliptical in section, smooth on the surface. Polypiferous lobes slender, erect; canals acute at the tips, and broad at the base, arranged obliquely and alternately on the antero-lateral faces of the stem. These lobes occupy the upper half of the polypidom, retaining their full size to the extreme apex, but diminishing below, so that on the middle of the stem they are exceedingly minute, and an inch or two below are only represented by a slight ridge on the sheath, in which are 2 or 3 cells. The lower portion of the sheath is dilated to about three times the thickness of the rest of the stem.

"Length 19 inches; diameter of the naked stem 0·03 inch, smallest diameter of stem with the sheath 0·04 inch; diameter of expanded base 0·13 inch; length of largest lobe 0·15 inch.

"Known from *V. elongata*, Gabb, by its more slender form, its proportionally large polypiferous lobes, its cylindrical stem without any grooves, and by the comparatively smaller portion of the stem bearing the lobes."—*Gabb, l. c.*

Hab. Monterey Bay, 20 fathoms (*Dr. J. C. Cooper*).

13. Virgularia elongata.

Virgularia elongata, *Gabb, Proc. California Acad. Nat. Sci.* ii. p. 167.

14. Virgularia patachonica.

Virgularia patachonica, *Darwin, Journal of Research*, p. 94.

Hab. Patagonia (*Darwin*).

"It consists of a thin, straight, fleshy stem, with alternate rows of polypi on each side, and surrounding an elastic stony axis, varying in length from 8 inches to 2 feet. The stem at one extremity is truncate, but at the other is terminated by a vermiform fleshy appendage. The stony axis, which gives strength to the stem, may be traced at this extremity into a mere vessel filled with granular matter. At low water hundreds of these zoophytes might be seen, projecting like stubble, with the truncate end upwards, a few inches above the surface of the muddy sand. When touched or pulled they suddenly drew themselves in with force, so as nearly or quite to

disappear. By this action the highly elastic axis must be bent at the lower extremity, where it is naturally slightly curved; and I imagine it is by this elasticity alone that the zoophyte is enabled to rise again through the mud. Each polypus, though closely united to its brethren, has a distinct mouth, body, and tentacula.

"Of these polypi, in a large specimen, there must be many thousands; yet we see that they act by one movement; they have also one central axis connected with a system of obscure circulation, and the ova are produced in an organ distinct from the separate individuals. Well may one be allowed to ask, what is an individual? It is always interesting to discover the foundation of the strange tales of the old voyagers; and I have no doubt that the habit of this *Virgularia* explains one such case. Capt. Lancaster, in his voyage in 1601, narrates 'that on the sea-sand of the island of Sombrero, in the East Indies, he found a small twig growing up like a young tree, and on offering to pluck it up, it shrinks down to the ground, and sinks, unless held very hard. On being plucked up a great worm is found to be its root, and as the tree groweth in greatness, so doth the worm diminish; and as soon as the worm is entirely turned into a tree, it rooteth in the earth, and so becomes great. This transformation is one of the strangest wonders that I saw in my travels! for if this tree be plucked up while young, and the leaves and bark stripped off, it becomes as hard as stone when dry, much like white coral; thus is this worm twice transformed into different natures. Of this we gathered and brought home many.'" —*Darwin, Journal of Research*, p. 199.

b. *Ridge of polype-cells contracted at the base; cells radiate, fleshy.*

6. LYGUS.

Coral free, elongate; base swollen into a bulb; upper part with a series of semicircular fleshy lobes on each side, consisting of 8 radiating polype-cells; tentacles retractile. The cells not produced. Axis elongate, filiform, cylindrical, flexible.

Lygus, *Herklots, Not.* p. 14; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.
Virgularia, *Lamk. A. s. V.* ii. p. 430.
Virgularia, sp., *Milne-Edw. & Haime, Corall.* i. p. 212.

15. Lygus mirabilis. B.M.

Coral filiform, elongate; base swollen; the lateral lobes recurved, each bearing 8 polype-cells. The lower part of the rachis with serrated bands of the not yet developed polypiferous lobes.

Pennatula mirabilis, *Müller, Z. Dan.* ii. t. 11; *Pallas, Zooph.* p. 370; *Sav. Brit. Misc.* p. 51, t. 25.
Virgularia mirabilis, *Lamk. A. s. V.* ii. p. 430, ed. 2. ii. p. 647; *Cuvier, R. A.* iii. p. 318; *Ehrenb. Corall. r. M.*; *Blainv. Man. d'Act.* p. 514, t. 96. f. 3 (cop. *Müller*); *Johnston, Brit. Zooph.* ed. 2, p. 161, t. 30; *Dana, Zooph.* p. 592; *Milne-Edw. & Haime, Corall.* i. p. 212; *Cuvier, R. A.* t. 91. f. 2.
Virgularia laxipinna, *Blainv. Man. d'Act.* p. 514, t. 90. f. 5.

Scirpearia mirabilis, *Templeton, Mag. N. H.* ix. p. 470.
Lygus mirabilis, *Herklots, Not.* p. 14; *Gray, Ann. & Mag. Nat. Hist.* v. p. 21; *Kölliker, Ic. Hist.* p. 160, f. 26.
Virgularia mirabilis (axis and spicula), *Quekett, Lect. Hist.* p. 135, f. 70.

Hab. North Sea: Norway; Berwick Bay.

16. Lygus Vanbenedenii.

Virgularia Vanbenedenii, *Herklots, Not.* p. 11, t. 7. f. 7; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20.

Hab. America.

17. Lygus Ellisii. B.M.

Cylindrical, elongate. Base elongate, the lower part much dilated, club-shaped. The lower pinnules adpressed, far apart, nearly transverse as regards the rachis; the upper ones lunate, far apart, placed alternately on each side of the axis, with distinct digitate united tubular cells.

Virgularia Ellisii, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 20.

Hab. ——? Broken at the tip. From the Old collection.

18. Lygus brasiliensis. B.M.

Coral cylindrical, very slender, dark brown (in spirits); polypes in small radiating clusters; axis cylindrical, very slender.

Hab. Brazil, Cape Frio. Presented by the Lords of the Admiralty.

This species is smaller, more slender, and the pinnules of the polypes appear to be more horizontal.

Var. *hexangularis*. The axis with six sharp longitudinal ridges, making it hexangular; from a fragment only.

Hab. Brazil, Cape Frio. B.M.

7. STYLATULA.

Coral elongate, slender, nearly cylindrical, near the base naked, bulbous at the end. Pinnæ short, supported by numerous strong radiating spines; the polypes clustered on their inner surface. Axis subcylindrical, extending through nearly the whole length.

Stylatula, *Verrill, Bull. Mus. Comp. Zool.* 1866, p. 30.

Hab. California.

19. Stylatula gracilis.

Coral very slender, nearly cylindrical above, base swollen; pinnæ at first very narrow, leaving a linear naked space between the two rows on both sides; higher up they overlap and are much crowded, thirty-two in an inch.

Length 1 foot or more; diameter 1 line.

Stylatula gracilis, *Verrill, Bull. Mus. Comp. Zool.* p. 30.

Hab. California, Cape St. Lucas.

20. Stylatula elongata.

Stylatula elongata, *Verrill, Bull. Mus. Comp. Zool.* p. 30.
Virgularia elongata, *Gabb, Proc. Calif. Acad. Sci.* 1863, ii. p. 167.

Hab. California; San Francisco.

Larger and stouter than *S. gracilis*; pinnæ broader and more overlapping, leaving a naked space between the rows for only a short distance in the middle, twenty occupying an inch; the spines are also larger and fewer.

Dr. Herklots refers to the *Funiculina cylindrica* of Lamarck with doubt. It has only been described from some stony axis. I think there is little doubt of this being the axis of the coral which I described as *Primnoella australasiæ*, the axis of which well agrees with Lamarck's description. He also inquires what is the *Pennatula scirpea* of Pallas (Zooph. p. 372. n. 218)? which has not been recognized in collections.—*Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.

The Alcyonoid described and figured by Linné under the name of *Pennatula mirabilis* (Mus. Adolph. Frid. Reg. t. 19. f. 1) appears to have little analogy with *Virgularia mirabilis*. It has a thin slender stem, attenuated at each end, and with a simple series of very short polypes on each side. Cuvier, in 1817, formed for it the genus *Scirpéaire* (Règ. Anim. iv. p. 85); Lamarck placed it under the genus *Funiculaire*, by the side of *Pavonaire*, under the name of *F. cylindrica* (H. A. s. V. ii. p. 423, ed. 2. p. 640); Fleming thinks it is not distinct from *Virgulaire* (Hist. Brit. Anim. p. 507); and M. de Blainville regards it as only a species of *Gorgonia* (see Man. d'Act. p. 515); but none of these opinions appear to M. Milne-Edwards to be admissible (see Corall. i. p. 114).

Fam. 2. PENNATULIDÆ or PENNIFERA.

Coral elongate or broad, pinnate; base sterile, subclavate. Polypes in expanded, fan-shaped pinules that arise from a narrow base in a series on each side of the front edge of the rachis. Polypes retractile. Axis calcareous, slender.

Pennatuleæ, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.

a. *Pinnules elongate, angular.*

* *Back of the rachis granular or tubercular, with undeveloped polypes.*

8. PENNATULA.

Coral pen-shaped, oblong. Rachis rough behind, spinulose. Stem short, thick, with a sunken central groove and a series of spines on

each side. The pinnules elongate, angular, uniform, thin, membranaceous, with very slender radiating spicules. Cells in a single series on the edge. Axis cylindrical, as long as the rachis.

Pennatula, *Lamk. Syst.* p. 380; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.

21. Pennatula rubra. B.M.

Pinnules membranaceous, elongate, slender; cells short, numerous, 20 or 21, crowded, scarcely divided.

Penna marina rubra, *Albinus, Acad. Annot.* p. 77, t. 3. f. 3, 4.
Penna rubra, *Bohadsch, Anim. Mar.* p. 108, t. 8. f. 1, 5 (copied *Ellis*).
Pennatula rubra, *Ellis, Phil. Trans.* liii. p. 426, t. 20. f. 1, 3; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22; *Pallas, Zooph.* n. 215; *Esper, Pflanzenth.* iii. p. 83, t. 2; *Cuvier, R. A.* ed. 2. iii. p. 318; *Dana, Zooph.* p. 595; *Herklots, Not.* p. 16.
Pennatula italica, *Ellis & Soland. Zooph.* p. 61, t. 21. f. 1, 2.
Pennatula setacea, *Esper, Pflanz.* ii. p. 93, t. . f. 7.
Pennatula granulosa, *Lamk. A. s. V.* ed. 2. ii. p. 644; *Milne-Edw. & Haime, Corall.* i. p. 209; *Blainv. Man. d'Act.* p. 517.
Pennatula phosphorea, *Cuvier, R. A.* ed. 2. iii. p. 318; *Chiaje, Mem.* iii. p. 11, t. 31. f. 15; *Johnston, Brit. Zooph.* ed. 2. p. 157.

Hab. Mediterranean (*P. P. Webb*); British Channel; Lisbon (*R. T. Lowe*).

9. PHOSPHORELLA.

Pen elongate. Stem elongate, slender. Pinnules membranaceous, with very slender radiating spicules. Polypes few (8 or 10), in a single series on the margin of each pinnule. Rachis granular, with a sunken central groove, without any lateral spines.

Herklots's figures are not as accurate as they might be.

22. Phosphorella phosphorea. B.M.

Pinnules 35, elongate, slender; polype-cells conical, produced.

Penna rosea, *Bohadsch, Anim. Mar.* p. 101, t. 8. f. 1, 4.
Pennatula phosphorea, *Linn. Amœn. Acad.* iv. p. 256; *Ellis, Phil. Trans.* liii. p. 420, t. 19. f. 1–5; *Esper, Pflanzenth.* iii. p. 85, t. 6; *Lamk. Syst. A. s. V.* p. 380, ed. 2. ii. p. 643; *Schweigger, Handb.* p. 435; *Milne-Edw. & Haime, Corall.* i. p. 208; *Blainv. Man. d'Act.* p. 517; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21; *Herklots, Not.* p. 15, t. 1. f. 1; *Dana, Zooph.* p. 594.
Pennatula phosphorea (animal &c.), *Quekett, Lectures Hist.* ii. p. 133, f. 69 A.
Pennatula rubra, var. β, *Pallas, Zooph.* p. 368. no. 215.
Pennatula brittanica, *Soland. & Ellis, Zooph.* p. 61.
Pennatula alba, *Esper, Pflanz.* iii. p. 92.
Pennatula rubra, *Chiaje, Mem.* iii. p. 10, t. 31. f. 7; *Ehrenb. Cor. r. M.* p. 36, t. 5.

Hab. Europe; Mediterranean (*P. P. Webb*); Coast of England; Hebrides (*Jeffreys*).

23. Phosphorella pulchella. B.M.

Pinnules 20, broad, oblong, membranaceous; polype-cells united.

Pennatula pulchella, *Valenc. Mus. Paris*; *Herklots, Not.* p. 16, t. 1. f. 2; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

Hab. North Cape; Shetland (*Laughrin*); Polperro (*Couch*); Mediterranean?

10. PTILELLA.

Pinnules membranaceous, broad, rounded, fringed with three close parallel series of short polype-cells on the edge. Rachis granular on each side behind, without any spines.

24. Ptilella borealis.

Pinnules broad, rounded, membranaceous, with three ranges of very close parallel cells.

Pennatula borealis, *Sars, Fauna Litt. Norv.* i. p. 17, t. 2; *Milne-Edw. & Haime, Corall.* i. p. 210; *Herklots, Not.* p. 17; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

Hab. North Sea.

11. LEIOPTILUS.

Pen ovate. Pinnules elongate, angular, fleshy, slightly grooved, without any elongated radiating spines. Cells crowded in a double row on the pinnules. Rachis granular behind.

Leioptilus, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22; *Verrill, Proc. Essex Inst.* iv. 1865, p. 182.

"This genus is most nearly allied to *Pennatula*, but differs in having soft, fleshy pinnæ, with even borders, and no apparent spicula. The polypes are in 2 or more rows along the edges of the pinnæ. The peduncle is enlarged into a conspicuous contractile bulb. The axis is very slender, quadrangular, and extends only through the middle portion of the body. The rudimentary individuals on the back are developed in the form of conspicuous papillæ."—*Verrill, l. c.*

25. Leioptilus fimbriatus.

Rachis very short.

Pennatula fimbriata, *Herklots, Not.* p. 18, t. 3. f. 3, t. 4. f. 1; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. 22.

Hab. Japan (Mus. Leyden).

26. Leioptilus undulatus.

Leioptilum undulatum, *Verrill, Proc. Essex Inst.* iv. 1865, p. 182.

Basal portion smooth, pointed at the end, swelling into a large bulb just below the pinnæ; posterior part of the body, except along a narrow median band, covered with large vermiform rudimentary polypes, forming rounded papillæ, some of which are one-tenth of an inch in diameter. Pinnæ large, very broad and rounded, with narrow bases, the edges thrown into undulations or frills. Polypes

rather large, arranged in three alternating rows along the edges of the pinnæ. Axis very slender, about 2 inches long, extending from about an inch above the basal end to about the middle of the pinnate portion. The naked base of a specimen 4¼ inches is 1¾ inch, the largest pinnæ ¾ inch long and 1⅛ wide; 25 pinnæ on each side.

Hab. California, Pinsacote Bay (*Stone*).

** *Rachis smooth behind.*

12. ARGENTELLA.

Coral elongate. Pinnules numerous (40 to 70), short, broad, one-fourth of a circle, supported by spines radiating from the base. Polypes in unequal series. Rachis smooth behind.

Pteroeides, sp., *Herklots, Not.* p.

27. Argentella elegans.

Pinnules 41; stem one-fifth of the entire length; apex naked.

Pteroeides elegans, *Herklots, Not.* p. 20, t. 6. f. 2; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

Hab. Indian Ocean.

28. Argentella grandis. B.M.

Pinnules 70; stem one-half the entire length.

Sagitta marina, *Rumph.*
Pennatula grandis, *Pallas, Zooph.* pp. 366. n. 213; *Cuvier, R. A.* iii. p. 318; *Blainv. Man. d'Act.* p. 517.
Pennatula argentea, *Ellis & Soland.* p. 66, t. 8. f. 1, 3; *Esper, Pflanz.* iii. p. 94, t. 8 (cop. *Ellis*); *Lamk. A. s. V.* ed. 2. ii. p. 641; *Cuvier, R. A.* iii. p. 318; *Ehrenb. Corall. r. M.*
Pennatula elongata, *Blainv. Man. d'Act.* p. 517; *Dana, Zooph.* p. 596.
Pteroeides grande, *Herklots, Not.* p. 21, t. 6. f. 1.
Pteroeides grandis, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

Hab. Indian Ocean (*B. M.*, in spirits, the specimens figured by Ellis, marked "*Pennatula argentea*").

Pennatula grandis, Ehrenb. Cor. r. M.; Herklots, Not. p. 22. Two feet long; the pinnate part 1½ foot long. The pinnules elongate near the end, small at the base, very far apart and imbricate; the naked part of the base is uncinated. Mus. Berlin: an old specimen without habitat, remarkable for the slenderness of the naked part.

29. Argentella Jukesii. B.M.

Feather oblong, broad. Pinnules short, broad, subtrigonal, rounded, only attached by the narrow base. Stem elongate, as long as the feather, thick; upper part, near the pinnæ, swollen.

Pteroeides Jukesii, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

Hab. Australia, Port Bowen.

a, b. In spirits. Port Bowen, Australia. Presented by J. B. Jukes, Esq.

30. Argentella Putmanni.

Coral small and delicate; the pinnate portion broad, oval in outline. Peduncle a little more than half the whole length, smooth and slender-pointed. Pinnæ broad.

Pteroeides Putmanni, *Verrill.*

Hab. California (?).

13. PTEROMORPHA.

Pen elongate, slender. Pinnules (20 to 28) elongate, supported by spicules arranged parallel with the hinder edges. Polypes on the two sides of the edges of the pinnules.

Pteromorpha, *Herklots, Not.* p. 18.

31. Pteromorpha Dringii. B.M.

Feather oblong, elongate. Pinnules rather elongate, rather longer than the breadth of the base, subtrigonal, only attached by half the lower edge. Stem elongate, as long as the feather, tapering at the base.

Hab. Swan River (*Mr. Dring*).

This dark-coloured fresh specimen shows a dark granular base at the pinnules, as is represented in Herklots's figure of *Pteromorpha crispa* (t. 5).

In the bleached specimens from Haslar Hospital this character is no longer to be seen.

32. Pteromorpha grisea. B.M.

Stem one-third the length of feather.

Penna grisea, *Bohadsch, An. Mar.* p. 109, t. 9. f. 1, 3; *Pallas, Zooph.* p. 367. n. 214; *Dana, Zooph.* p. 596.
Pennatula spinosa, *Ellis, Phil. Trans.* liii. p. 434, t. 20. f. 6, 7.
Pteromorpha crispa, *Herklots, Not.* p. 19, t. 5.
Pteroeides grisea, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.
Pennatula grisea (spicules), *Quekett, Lectures Hist.* ii. p. 133, f. 69 B, C, D, E, (axis) F.

Hab. ——? Old Collection.

33. Pteromorpha expansa.

Pteromorpha expansa, *Verrill, Proc. Essex Inst.* iv. 1865, p. 181, t. 5. f. 1 (animal).

The pinnate portion is broad, ovate, and abruptly rounded below. Peduncle or basal portion thick, swollen, a little less than half the entire length. Pinnæ crowded, about 32 on each side, long and wide, somewhat thickened, angular; the naked hinder margin somewhat concave, the anterior rounded and supporting numerous small polypes and strengthened with sharp spines, which are often in clusters of

2 or 3; the outer halves of the sides of the pinnæ, as well as their anterior edges, are crowded by small polype-cells; basal half of the lower surface densely covered by small papillæ. Axis stony, pointed at the ends; anterior cavity of the base small.

Length of a large specimen, in alcohol, 6 inches; breadth across pinnæ 3·5 inches; length of peduncles 2·75 inches.

Colour, when alive, white; bases of the polypes dirty white; on the stalk there are a few scattered blackish spots.

It lives with the stalk immersed in the mud like *Renilla*; undulating moving contractions are often seen on the stalk, resembling those of a *Holothuria*.

Hab. China Bay, opposite Hong-Kong, 6 fathoms, mud.

14. PTEROEIDES.

Pen short, broad. Rachis smooth. Pinnules elongate, angular, expanded, supported by bundles of spicules diverging from the base, with the edge entire. Polypes on upper and underside near the edge of the pinnules. Axis cylindrical.

Pteroeides, *Herklots, Not.* p. 19; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

34. Pteroeides latipinnarum.

Stem one-half the entire length of the feather; pinnules 30.

Pteroeides latipinnarum, *Herklots, Not.* p. 19, t. 4. f. 2; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 22.

Hab. Mediterranean.

35. Pteroeides spinosum. B.M.

Pinnules 24.

Pennatula albida, *Albinus, Acad. Ann.* p. 77, t. 7. f. 1, 2.
Pennatula spinosa, *Ellis, Phil. Trans.* liii. p. 434, t. 21. f. 6–10; *Lamk. A. s. V.* ed. 2. iii. p. 644; *Chiaje, Mem.* iii. p. 9, t. 31. f. .
Pennatula grisea, *Pallas, Zooph.* p. 367. sp. 214, part; *Milne-Edw. & Haime, Corall.* i. p. 209; *Esper, Pflanz.* iii. p. 81, t. 1*a*; *Cuvier, R. A.* iii. p. 318; *Chiaje, Mem.* p. 10, t. 31. f. ; *Blainv. Man. d'Act.* p. 516, t. 89. f. 1.
Pteroeides spinosum, *Herklots, Not.* p. 21, t. 3. f. 1; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

Hab. Mediterranean.

36. Pteroeides Esperi. B.M.

Pinnules 24, broad, oblong; stem very thick, about one-third the entire length.

Pennatula grisea, *Esper, Pflanz.* iii. p. 81, t. 1 (dry specimen).
Pennatula grisea, *Lamk. H. A. s. V.* ed. 2. ii. p. 644.
Pteroeides Esperi, *Herklots, Not.* p. 20, t. . f. ; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

Hab. Island of Sumatra; New Guinea (*Capt. Sir E. Belcher*).

37. Pteroeides japonicum.

Pteroeides japonicum, *Herklots, Not.* p. 21, t. 2. f. 1; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 21.

Hab. Japan.

b. *Pinnules square, fleshy.*

15. CRISPELLA.

Coral lanceolate. Rachis very thick. Pinnules few (14), very short, subquadrangular, with the polypes in a series on the upper and lower surface.

38. Crispella Sieboldii.

Pinnules 14.

Pteroeides Sieboldii, *Herklots, Not.* p. 22, t. 3. f. 1; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

Hab. Japan.

c. *Pinnules semicircular, fleshy.*

16. SARCOPTILUS.

Rachis granular. Stem one-third the entire length. Pinnules fleshy, roundish, coriaceous, closely imbricate, granular, with a thin rounded edge. Cells small on the edge and around the upper surface near the edge. Axis subquadrangular, thick.

Sarcoptilus, *Gray, Proc. Zool. Soc.* 1848, p. 45; *Herklots, Not.* p. 18; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

When I first described this genus I believed that the polypes were "scattered over the upper surface of the pinnæ;" but that is a mistake which I was led into by the imperfect state of the specimen: the polypes are only placed on the margin of the pinnæ as in other *Pennatulidæ*.

39. Sarcoptilus grandis. B.M.

Oblong, orange. Pinnules small, granular, with regular, smooth, rounded edges. The stem short, thick, one-third the entire length.

Sarcoptilus grandis, *Gray, Proc. Zool. Soc.* 1848, p. 45, t. 1; *Ann. & Mag. Nat. Hist.* ii. p. 76, 1860, v. p. 23.

Hab. Australian seas: Sydney (*Bennett*, presented by Sir William Hooker); Sydney, Australia, New South Wales (presented by Dr. G. Bennett, F.L.S.).

17. PTILOSARCUS.

Rachis minutely granular, thin, one-half the entire length. Pinnules fleshy, rounded, closely imbricate, with flattened, rather broad edge, spinulose on the margin. Cells large, on the flattened edges surrounded with spicules. Axis ——?

Sarcoptilus, § Ptilosarcus, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.
Ptilosarcus, *Verrill, Proc. Essex Inst.* 1865, p. 183.

"Coral thick, club-shaped. Pinnæ numerous, crowded, with thickened edges, on which the polypes are arranged in several rows; each cell surrounded by prominent spine-like spicules. The back of the body, except along a narrow medial space, is covered by prolonged bands of rudimentary polypes, appearing like crowded granulations. The basal portion is thick and bulbous, with two large anterior cavities, one of which extends along the anterior surface, communicating with the pinnæ, the other along the dorsal portion. The axis is long, fusiform, tapering to very slender points (which are curved, in preserved specimens, into a loop) at each end. Connected with the lower part of the axis are very strong, thickened muscles, which pass obliquely upwards and outwards to the wall-tissue, while higher up, a little above the lowest pinnæ, other shorter ones are attached, which pass obliquely downward to the wall."—*Verrill, l. c.*

40. Ptilosarcus Gurneyi. B.M.

Oblong, orange. Pinnules smooth, very crowded, closely imbricate, with a rather broad, distinctly spinulose margin; cells crowded. Stem elongate, thick, one-half the entire length, swollen above just under the pinnæ.

Sarcoptilus (Ptilosarcus) Gurneyi, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23, t. 3. f. 2.
? Pennatula tenuis, *Gabb, Proc. Cal. Acad. Nat. Sci.* 1862, ii. p. 166.
Ptilosarcus Gurneyi, *Verrill, Proc. Essex Inst.* 1865, iv. p. 182.

Hab. California, Monterey (*Gurney*).

Basal portion about one-half the whole length, thick, bulbous, very muscular, the surface strongly sulcated in contraction. Pinnæ smooth on the sides, broad, rounded, nearly semicircular, with a broad base, the posterior edge extending beyond the base as a rounded lobe; the edge is thickened and covered by the polypes arranged in four rows. Each cell armed with two short spinules. Along the back are two broad bands of very small papillæ or granuliform rudimentary polypes.

Length 10 inches, greatest breadth 2 inches; length of pinnæ $\frac{3}{4}$ inch, breadth $1\frac{1}{2}$ inch; length of naked base $4\frac{3}{4}$ inches, diameter $1\frac{1}{4}$ inch, with 52 pinnæ on each side.

Hab. Washington Territory, Puget Sound (*Kennerly*).

41. Ptilosarcus sinuosus. B.M.

Oblong. Pinnules much crowded, crumpled, slightly spinulose on the margin. Stem very thick, swollen, as long as the feathered part.

Sarcoptilus (Ptilosarcus) sinuosus, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23, t. 3. f. 1.

Hab. New Guinea (*Capt. Sir E. Belcher*).

Subsection II. CLAVIFORMES.

Coral club-shaped or leaf-like. Polypes scattered on one or on all sides of the upper part of the club.

Fam. 3. KOPHOBELEMNONIDÆ or CLAVIFORMES.

Coral club-shaped, with an irregular row of large, prominent, not retractile polypes on each side of the front surface.

Kophobelemnonieæ or Claviformes, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

18. KOPHOBELEMNON.

Coral simple, fleshy, subclavate, covered with calcareous spicula, with an irregular row of large polypes; the polypes (cells) placed in longitudinal rows on two sides, leaving the dorsal surface bare. Polypes large, not retractile. Axis slender, stony, as long as the rachis.

Kophobelemnon, *Asbjörnsen in Sars's Fauna Litt. Norv.* ii. p. 81; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23; *Verrill, Proc. Essex Inst.* 1865, iv. p. 152.
Pennatula, sp., *Müller.*
Funiculina, sp., *Lamk.*
Veretillum, sp., *Cuvier.*

"Polyparium liberum carnosum, spiculis calcareis farctum; rachis claviformis epinnata latere anteriore solum papillis polypiferis per quatuor series longitudinales alternantes dispositis obsito. Polypi maximi, toti retractiles, octo tentaculis pinnatis circa os ornati. Axis gracilis subcalcarea vel sublapidea."—*Sars.*

42. Kophobelemnon stelliferum. B.M.

Pennatula stellifera, *Müller, Zool. Dan. Prod.* n. 3076; *Zool. Dan.* i. p. 44, t. 36. f. 1–3; *Dana, Zooph.* p. 590.
Funiculina stellifera, *Lamk. A. s. V.* ed. 2. ii. p. 641.
Veretillum stelliferum, *Cuvier, R. A.* iii. p. 319; *Ehrenb. Corall. r. M.*; *Philippi, Wiegm. Arch.* i. p. 276.
Umbellularia stellifera, *Blainv. Man. d'Act.* p. 513, t.
Kophobelemnon Mülleri, *Asbjörnsen in Sars's Fauna Norv.* ii. p. 81, t. 10. f. 1–7.
Kophobelemnon stelliferum, *Herklots, Not.* p. 23; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

Hab. North Sea; Gulf of Christiania.

43. Kophobelemnon Burgeri.

Kophobelemnon Burgeri, *Herklots, Not.* p. 24, t. 7. f. 5; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 23.

Hab. Japan.

44. Kophobelemnon clavatum.

Kophobelemnon clavatum, *Verrill, Proc. Essex Inst.* iv. 1865, pp. 152, 185, t. 5. f. 4.

Veretillum clavatum, *Stimpson, Proc. Philad. Acad. N. S.* 1865.

Polypes more numerous and crowded than in *K. Burgeri*, Herkl., which it resembles; body more claviform, naked, dorsal space very narrow.

Hab. Hong-Kong, 6 fathoms, mud (*W. Stimpson*).

Polypes large; the tentacles long and slender, with oblong lateral lobes; surface of the body, between the polypes, irregularly papillose, variegated, punctate with orange and spotted with brown; basal portion white, with a pointed extremity. Length 2 inches.

The species is more claviform and has much more crowded polypes than *K. Burgeri*, Herkl. The naked dorsal space is scarcely apparent, owing to the crowding of the polypes towards it upon each side.

Fam. 4. VERETILLIDÆ or VERETILLOIDS.

Coral club-shaped, with the polypes scattered on all sides, leaving only a small linear dorsal area; back granular.

Veretilleæ or Veretilloids, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24, 1862, x. p. 73.

Professor Milne-Edwards, in the first volume of his 'Coralliaires,' published in 1857, divides the Claviform Pennatulidæ into three genera, thus:—

1. *Lituaria*, with a distinct, well-developed, quadrangular central stony axis.
2. *Veretillum*, with a rudimentary hard central axis.
3. *Cavernularia*, without any hard central axis, but with four large longitudinal central cells.

Dr. Herklots, in his "Monograph of the Pennatulidæ," in the 'Bijdragen tot die Dierkunde' for 1858, divides them into four genera, adding the genus *Sarcobelemnon* to the above list. The species of *Lituaria* and *Sarcobelemnon* are found in the Indian and Australian Oceans, and those of *Veretillum* and *Cavernularia* are confined to the Mediterranean. The Veretillidæ in the British Museum appear to belong to only two genera or groups, viz.:—

1. *Veretillum*. The club with a short, thick base, with four more or less large longitudinal cells in the centre.
2. *Lituaria*. The club with an elongated base, and with a strong subquadrangular, central, more or less stony axis.

The former group seems to be synonymous with the genera *Veretillum* and *Cavernularia* of Milne-Edwards and *Sarcobelemnon* of Herklots. I call the first genus by the name *Veretillum*, because I find that the specimen of *Pennatula cynomorium* which we have in the British Museum does not appear to have any rudiment of an

axis, and has the four large longitudinal cavities in the centre of the coral which are described as characteristic of *Cavernularia* and *Sarcobelemnon*. Can the septa between these cells have been considered the rudimentary axis?

19. VERETILLUM.

The pen club-shaped, with a short, thick, fleshy base; the upper part of the club short and thick, or more or less tapering, covered with close, longitudinal rows of polypes; the interspaces between the polypes marked with very close, opake, imbedded granules; the opening of the polype-cells, when contracted, transverse; the middle of the coral furnished with four quadrangular tubes, and without any hard central axis.

Veretillum, *Lamk. Syst.* p. 381.
Veretillum, pt., *Cuvier, R. A.* ed. 2. iii. p. 314.
Veretillum, sp., *Valenc. Arch. du Mus.* v. p. ; *Herklots, Not.* p. 26; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24, 1865, x. p. 73.
Cavernularia, *Valenc. in Milne-Edw. & Haime's Brit. Foss. Corall. Intr.* p. lxxxiv, 1850; *Arch. du Mus.* v. p. 191; *Herklots, Not.* p. 25; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24.
Sarcobelemnon, *Herklots, Not.* p. 25; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24.

45. Veretillum cynomorium. B.M.

Alcyonium epipetrum, *Linn. S. N.* ed. 12.
Finger-shaped Sea-pen, Pennatula marina digitiformis vel Cynomorium, *Ellis, Phil. Trans.* liii. p. 434, t. 21. f. 35.
Pennatula cynomorium, *Pallas, Misc. Zool.* p. 176, t. 13. f. 14; *Zooph.* p. 373. n. 221; *Ellis & Soland. Zooph.* p. 65; *Blainv. Faune Franç. Zooph.* t. 2. f. 1, 2; *Rüpp. Nov. Act. Ac. Cæs. Leop. N. C.* xiv. t. 38.
Veretillum cynomorium, *Lamk. Syst.* p. 381; *Herklots, Not.* p. 27; *Milne-Edwards, Cuvier, R. A.* t. 91. f. 1; *Gray, Ann. & Mag. Nat. Hist.* v. 1860, p. 24, 1864, x. p. 73.

Hab. Mediterranean.

A specimen of this species in the British Museum is, I believe, that described by Ellis, on the Sea-pens, as *Cynomorium* (Phil. Trans. 1765, vol. liii. p. 434, t. 13. f. 3); for it has the label on it, written by my late uncle, who died in 1806, like the label on the specimen of *Siren*, which was presented by Ellis. It certainly has no appearance of any hard central axis, unless the rather hard septa between the central cells may be considered an axis; if they are, then the same kind of axis is found in each of the other species which I have referred to this genus.

46. Veretillum obesa.

Cavernularia obesa, *Valenc. l. c.*; *Milne-Edw. & Haime, l. c.* p. 191.

Hab. Mediterranean.

Only the name given, not described nor figured: is it the same as the former?

47. Veretillum Australasiæ. B.M.

Polypes far apart. The club elongate, rather tapering at the end. The stem short, about one-sixth the length of the club, longitudinally wrinkled, subacute.

Sarcobelemnon Australasiæ, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24, t. 4. f. 1.

Veretillum Australasiæ, *Gray, Ann. & Mag. Nat. Hist.* x. p. 73.

Hab. Port Essington (*J. B. Jukes, Esq.*).

The specimen in the Museum is rather flattened on one of its sides; but this appears to have arisen from its having been pressed against the sides of the bottle when it was first placed in spirits. The polypes are very unequally developed. On one side near the base they appear to be absent, but when more closely examined they are easily seen to be completely retracted and closed over.

This specimen chiefly differs from the *V. Cantoriæ* in the substance of the coral being harder, and in the cells of the polypes being further apart and more scattered, not appearing to be placed in such regular and close longitudinal rows. The specimen seems to have been placed in very strong spirits when first collected, as almost all the polypes are retracted, and the base of the club is wrinkled, as if strongly contracted, and the cavities in the axis are smaller; but all this may have been produced by the sudden and great contraction of the animal at the time it was preserved.—*Ann. & Mag. Nat. Hist.* x. p. 74.

48. Veretillum Cantoriæ. B.M.

Cells of polypes close together, in regular longitudinal series.

Veretillum Cantoriæ, *Gray, Ann. & Mag. Nat. Hist.* x. p. 74.

Hab. Penang (*Dr. Cantor*).

In the British Museum there is a large series of specimens of this species from Penang, where, I am told, they are collected for food. They differ exceedingly from each other; and if they are all of one species, as I suspect is the case, it shows how difficult it is to give a character that shall define the species of the genus. Some are short, thick, oblong, rounded at each end, varying from $2\frac{1}{2}$ to 3 inches long. In most of the specimens of this form, the polypes are retracted; but in one, some of them are expanded. In the second form the club is much larger, varying from 3 to 7 or 8 inches long, and is attenuated upwards. The base of the club is short and thick, as in the former set of specimens. The polypes are generally expanded; they are much more slender and more elongate than the polypes of *Lituaria australis*. Probably the length and tapering form of these specimens may be dependent on their having been placed originally in weaker spirits. The size of the cavities or tubes in the specimens also differ; they are largest in the short broad specimens, but very distinct in all.

49. Veretillum elegans.

Stem 1 inch long.

Sarcobelemnon elegans, *Herklots, Not.* p. 25, t. 7. f. 3; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24.

Hab. Japan (Mus. Leyden).

50. Veretillum Stimpsonii.

Veretillum Stimpsonii, *Verrill, Proc. Essex Inst.* 1865, iv. pp. 152, 184, t. 5. f. 3, 3*a*.

Coral 5 or 6 inches long, enlarged above for more than half the entire length. Polypes much exserted, upwards of an inch long; tentacles very long. Axis thick, short, fusiform, one-third of an inch long; base white, somewhat striated; body light cream-colour. Polypes transparent, bluish-white at the base of the tentacles.

Hab. Hong-Kong, 6–10 fathoms (*W. Stimpson*).

Body white, cream-colour. Polypes transparent, with an opaque digestive tube, bluish white about the bases of the tentacles; base white, somewhat longitudinally striated. The polypiferous portion of surface thick, swollen, somewhat fusiform, broadest below the middle; the surface granulose; basal portion less than a third of the whole length, bulbous, smooth, and very contractile. Polypes rather distantly scattered, arranged somewhat in quincunx; between them are numerous minute papillæ or rudimentary polypes: in expansion the polypes are much exserted, with very slender elongated tentacles, bordered with rather distant elongated slender lobes in a single row on each side, commencing close to their bases. Axis short, thick, fusiform, situated just below the commencement of the polypiferous part.

Length $3\frac{1}{2}$ inches, naked part 1 inch; diameter in broadest part 1 inch; length of axis $\frac{1}{3}$ inch. When living, length $6\frac{1}{2}$ inches; breadth $4\frac{3}{4}$ inch; polypes exserted about $\frac{3}{4}$ inch.

51. Veretillum baculatus.

Veretillum baculatum, *Verrill, Proc. Essex Inst.* 1865, iv. pp. 152, 185.

Club-shaped; the base about one-third the length. Polypes scattered, not numerous. Axis small, fusiform, about half an inch long in a specimen 3 inches long.

Hab. Sea of Ochotsk, off Siberia (*L. M. Squires*).

Only a single specimen obtained. Small, clavate, broadest near the upper end, which is obtusely rounded; polypiferous portion about one-half the whole length; naked basal portion elongated, pointed below in one specimen, with a distinct terminal pore. Axis small, fusiform, less than one-half an inch long. Polypes much smaller and more numerous than in *V. Stimpsonii*. Length 2 inches, diameter $\frac{1}{3}$ inch.

52. Veretillum Valenciennesii.

Cavernularia Valenciennesii, *Herklots, Not.* p. 26, t. 7. f. 4.

Hab. Mediterranean, Palermo (Mus. Leyden).

53. Veretillum luteum.

Veretillum luteum, *Quoy & Gaim. Ann. Sci. Nat.* x. p. 188, t. 9 *a*; *Dana, Zooph.* p. 590; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24; *Herklots, Not.* p. 27.

Hab. Atlantic Ocean, Bay of Algesiras.

? See *Veretillum clavatum*, Leuck. Zool. Bruchst. ii. p. 120 (a doubtful species).

54. Veretillum pusillum.

Veretillum pusillum, *Philippi, in Wiegm. Arch.* i. p. 277, t. 4. f. 6–10.
Cavernularia pusilla, *Herklots, Not.* p. 26.

Hab. Mediterranean, Palermo.

20. LITUARIA.

Coral club-shaped, elongate, smooth, without any appearance of minute glands. Club minutely granular. Stem above one-third to one-half the entire length; smooth, without any granulations. Polypes completely retractile. Polype-cells regularly disposed on all sides of the club, with a contracted oblong or linear mouth, on a level with the bark. Axis hard, stony, quadrangular.

The lower part of the coral, which is destitute of polypes, is elongate, often one-third, and rarely nearly half as long as the upper polype-bearing portion of the club; the length of the stem, as compared with the club, appears to differ, within certain limits, in different specimens of the same species from the same locality, but it is always larger and more slender than the same part in the genus *Veretillum*.

Lituaria, *Valenc. in Milne-Edw. & Haime, Brit. Foss. Corals*, Intr. p. lxxxiv, 1850; *Arch. Mus. H. N.* v. p. 190; *Herklots, Not.* p. 24; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24, 1862, x. p. 73.
Veretillum, sp., *Cuvier, Lamk. Syst.* v. p. 381.

55. Lituaria phalloides. B.M.

Pennatula phalloides, *Pallas, Misc.* p. 179, t. 23. f. 5–9; *Zooph.* p. 373. n. 220.
Veretillum phalloides, *Cuvier, R. A.* iii. p. 319; *Schweigger, Handb.* p. 436; *Lamk. Syst. A. s. V.* p. 381; *Hist. A. s. V.* ed. 2. ii. p. 638; *Blainv. Man. d'Act.* p. 518; *Ehrenb. Corall. r. M.*; *Dana, Zooph.* p. 590.
Lituaria phalloides, *Milne-Edw. & Haime, Arch. du Mus.* v.; *Herklots, Not.* p. 24; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24.

Hab. Penang.

In four specimens from Penang, collected by Dr. Cantor, which are slender and white, all the polypes are entirely contracted, leaving

a compressed slit over the cell, except in one of the small specimens, in which a few of the polypes are partly exserted; they are pale brown. In one of the specimens the fleshy part of the base is thickened, and has contracted so much that the hard axis is exserted nearly an inch beyond the base. From this specimen I am led to believe that the length and slenderness of the club in the genus, when in spirit, is preserved by the rigidity of the internal axis. These specimens are probably the *Lituaria phalloïdes* of Milne-Edwards (Coralliaires, vol. i. p. 217), founded on the *Pennatula phalloïdes* of Pallas (Misc. Zool. t. 13. f. 5, 6, 7, 8).

21. POLICELLA.

Coral club-shaped, smooth, slightly longitudinally plicated, with longitudinal series of close pellucid dots or glands. Stem short, rather tapering, in spirits bent up at the base. Polypes not retractile, unequal-sized, scattered and solitary, or in groups of 3 or 4 equally on all sides of the club. Axis hard, stony, quadrangular.

56. Policella australis. B.M.

Polypes black or grey, with black mouths; stem one-third of the entire length.

Lituaria australis, *Gray, Ann. & Mag. Nat. Hist.* 1862, x. p. 76.

Hab. Australia, Sharks' Bay (*Rayner*).

Three specimens were sent home by Mr. Rayner; they are softer and less contracted than the preceding; the pores on the surface are more distinct, and are furnished with more or less dark polypes, which are all expanded. The polypes in one specimen (which is in the most perfect condition) are all entirely of uniform black-brown colour. In one of the other specimens (also in good condition) the polypes are pale brown, with a broad black lower ring at the upper part of the tubular body, near the base of the arms. In the other specimen (which is imperfect) the polypes are all pale brown, like the coral.

In all the three specimens the polypes at the lower half of the club are further apart than they are at the tip; this is especially the case in the specimen which has the dark ring on the polypes, in which the polypes in the lower part of the club are very far apart and few in number, and appear as if placed in longitudinal lines.

22. CLAVELLA.

Coral clavate. Club and stem smooth; club polished, very closely and minutely punctulated, with dark sunken spots or glands not placed in regular longitudinal lines; club one-third of the entire length. Polypes quite retractile. Axis none.

57. Clavella australasia. B.M.

Hab. Australia.

Fam. 5. RENILLIDÆ.

Coral frondose, expanded, fleshy, without any axis. Stem with abundance of red trigonal spicules.

"Polypes arranged symmetrically on the upper surface of a more or less flattened cavernous disk, or frond, to the lower surface of which there is attached a hollow locomotive organ, in the form of a peduncle destitute of a solid axis."—*Verrill, Mem. Boston Soc. Nat. Hist.* i. p. 12.

1. Renilla. Frond oblong or kidney-shaped. Polypes numerous.
2. Herklotsia. Frond oblong or kidney-shaped. Polypes few.
3. Renillina. Frond expanded, lobed. Polypes few.

23. RENILLA.

Renilla, *Lamk. A. s. V.* ed. 2. p. 248; *Dana, Zooph.* p. 588.

Disk smooth above and beneath. Frond oblong, kidney-shaped, continued into the stem. Polypes numerous.

"Frond more or less reniform, with a notch or sinus in the posterior edge; lower surface somewhat striated with radiating lines; upper surface with scattered cells surrounded by spicula, which usually project a little above the surface. Polypes, when expanded, much exserted, but capable of entire retraction. Among the perfect polypes are scattered numerous rudimentary individuals, which appear like clusters of small white papillæ. The peduncle is attached to the lower surface at or near the sinus; it is hollow, more or less coriaceous, filled, like the surface of the frond, with calcareous spicula, but capable of a great amount of contraction and expansion; a membrane divides it into an anterior and posterior longitudinal chamber. The former communicates with a large cavity occupying the central and posterior portion of the upper surface, and from this, by numerous openings, with other cavities, filling the whole interior of the frond, and connected with the polypes. The posterior chamber communicates directly with a large cavity at the origin of the peduncle, and then by numerous small openings with the other cavities of the disk. The tentacles have rather long lobes, in a single row on each side."—*Verrill, Mem. Boston Soc. N. H.* i. p. 17.

58. Renilla reniformis. B.M.

Kidney-shaped Sea-Pen, *Ellis, Phil. Trans.* liii. p. 427, t. 19. f. 6–10.
Pennatula reniformis, *Pallas, Zooph.* p. 374. n. 222; *Ellis & Solander, Zooph.* p. 65.

Renilla americana, *Lamk. A. s. V.* ii. 429.
Renilla americana (spicula), *Quekett, Lectures Hist.* ii. p. 133, f. 69, G, H.
Alcyonium agaricum, *Gmel. S. N.* p. 3811.
Renilla americana, *Schweig. Beob.* p. 23, t. 2. f. 10; *Ehrenb. Corall. R. M.*; *Blainv. Man. d'Act.* p. 528; *Dana, Zooph.* p. 588, t. 57. f. 1, 1*a*.
Renilla reniformis, *Cuvier, R. A.* ed. 2. p. 319; *Herklots, Not.* p. 28, t. 7. f. 1; *Gray, P. Z. S.* 1860, v. p. 24.

Hab. Coast of Brazil, Bay of Rio Janeiro; West Indies.

"Frond rounded, reniform, or heart-shaped, a little longer than broad. Sinus extending about one-third across the disk, rounded within, the posterior lobes meeting, or overlapping somewhat behind; peduncle well-developed, bulbous at the end, and enlarged where it joins the disk to form, in part, the dorsal cavity of the disk. Lower surface of the frond nearly smooth, but marked with fine radiating striæ, filled with small spicula, and with a network of light-coloured lines. Cells few, rather large, surrounded by small and slightly prominent spicula; rudimentary individuals numerous, irregularly scattered among the cells, a little prominent, composed of eight or ten little lobes. Colour of the disk, when living, according to the drawings of Prof. Agassiz, a vivid reddish purple. Peduncle the same colour, except at the tip and point of union with the disk, where it is lighter; polypes diaphanous, delicate bluish white, the walls with specks of brown, and a circle of brown spots just below the tentacles; tentacles diaphanous, with a marginal line of brown spots on each side beneath, widening towards the base. The polypes are arranged symmetrically on each side of a narrow naked space extending from the sinus more than half across the disk, and situated above the large central chamber within; when expanded they are much exserted, but less so than in other species of the genus. The tentacles are narrow, lanceolate, with rather distant, long lobes, which are confined principally to the outer half. Mouth oblong, with four small rounded lobes on each side.

"This species is capable of distending itself greatly with water, when it becomes very thick and swollen, thinnest at the edges; the peduncle can expand to four or five times its length when contracted. According to Prof. Agassiz, who has carefully studied it while living, it is remarkably phosphorescent, emitting a 'golden-green light of a most wonderful softness.' Its ordinary position, when expanded, is to have the peduncle buried perpendicularly in the sand, and swollen into a bulb at the end. In locomotion the disk itself can be used, either by alternately contracting and expanding the two lateral portions, or by expanding and extending the anterior end, and then contracting so as to form a transverse constriction which gradually passes off posteriorly (Coll. Mus. Comp. Zool.). It is found quite commonly at low-water mark and in pools left by the tide on the coast of Georgia and South Carolina, extending as far northward as Beaufort, N. C."—*Verrill, Mem. Boston Soc. N. H.* i. p. 15.

59. Renilla violacea.

Frond with a notch in front.

Renilla violacea, *Quoy & Gaim. Voy. Uran.* p. 642, t. 82. f. 5, 6; *Ehrenb. Corall. R. M.*; *Blainv. Man. d'Act.* p. 518, t. 91. f. 2 (cop. *Quoy*); *Dana, Zooph.* p. 589; *Herklots, Not.* p. 28; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24.

Hab. Coast of Brazil; Rio Janeiro.

60. Renilla amethystina.

Renilla amethystina, *Verrill, Proc. Boston Soc. Nat. Hist.* April 18, 1866, p. 29.

Hab. On mud flats, edge of sand beach, east of the R.R. wharf, Panama (*F. H. Bradley*).

This large and fine species was found so abundantly on mud flats at low water, by Mr. Bradley, that in three days he obtained 150 specimens. Some of them were 6 inches across while living. It was usually deep purple, but occasionally light purple or white. According to Mr. Bradley's observations upon the living polypes, these are mostly ·25 inch long, and about ·12 inch across the expanded tentacles, the bodies of the polypes being about ·06 inch. They are transparent, with an opaque stomach, the eight radiating lamellæ showing through the walls; around the small mouth, which is edged with white, are eight radiating white points, corresponding to the intervals between the tentacles; around the bases of the tentacles is a brown ring, which runs down in points opposite to the spaces between them. Opposite to the base of each polype are two (rarely four or five) bunches of little white rays. The frond is nearly transparent, but highly coloured by very numerous purple spicula, evenly distributed on the peduncle and lower surface, but on the upperside arranged along the edges of the polypiferous radiating lines, and especially concentrated about the five (rarely six or seven) white points that surround the closed polypes. The polypes are arranged somewhat in quincunx, in lines that radiate from the attachment of the peduncle, and curve outward on the sides to the lobes. The tentacles are narrow and tapering, ·04 to ·06 inch long, bearing, especially in young specimens, well-marked pinnæ at the tip and edges, which in old ones often become reduced to a mere fringe.

61. Renilla Danæ.

Renilla Danæ, *Verrill, Bull. Mus. Comp. Zool.* p. 29.
Renilla americana (part.), *Dana, Zooph.* t. 57. f. 1.
Renilla reniformis, *Herklots, Not.* p. 28.

Hab. Rio Janeiro.

"This differs widely from *R. reniformis* in its broad rounded form, its being wider than long, while *R. reniformis* is longer than broad, in its much deeper sinus and overlapping posterior lobes, in its costate and granular under surface, which in the other is nearly smooth

with lighter radiating lines, in its more crowded and smaller polypes, and in having much more prominent spicula on the upper surface around the cells; its colour also is darker purpule."—*Verrill.*

62. Renilla peltata.

Renilla peltata, *Verrill, Bull. Mus. Comp. Zool.* p. 29.

Hab. Breton Island, near the mouth of the Mississippi river.

This is a very large species, readily distinguished by its very broad thick frond, nearly straight on the outer margin, shallow sinus, and central position of the peduncles; the cells are larger than in any other known species, and armed with fine prominent spicula. In spirit, light purple.

63. Renilla patula.

Renilla patula, *Verrill, Bull. Mus. Comp. Zool.* p. 29.

Hab. Cumana (*Verrill*), South America.

Very large and thin, with a broadly reniform frond, regularly rounded on the outer margin; sinus very deep, dividing the frond beyond the middle, with the posterior lobes considerably overlapping. Cells rather small.

64. Renilla australasica. B.M.

Thick, lobes overlapping.
Hab. Australia (*H. Cuming*).

24. HERKLOTSIA.

Disk expanded, upper surface armed with spicula surrounding the edge of the cells, moderately striated beneath, and separated from the stem by a deep notch, marked beneath by a distinct groove. Polypes few, placed in series.

Herklotsia, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 25.

65. Herklotsia Edwardsii.

Renilla Edwardsii, *Herklots, Not.* p. 29, t. 7. f. 2.
Herklotsia Edwardsii, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 25.

Hab. Coast of Central America (*D'Orbigny*, Mus. Paris.).

25. RENILLINA.

Disk oblong, elongated, sinuated on each side, dividing it into more or less deep lobes; cells rather distant; stem thick, as long as the disk; longitudinally wrinkled.

Renilla, § 2, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24.

66. **Renillina sinuata.** B.M.

Renilla sinuata, *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 24, t. 4. f. 2.

Hab. Philippines (*H. Cuming, Esq.*).

Fig. 1.

Renillina sinuata.

Section II. *Umbellularia.*

Body radiate, with a central posterior stem.

"Rays tubular, divided into numerous (30) conical tubes, each ending in a polype with eight pinnate tentacles. The outer calices are the largest, and the middle ones less and less; they are like a thick, tough skin, easily torn when wet."

"The stalk is square, with a notch on each side; the axis is white, of a substance like wood, with long filaments nearly as hard as ivory." —*Mylius.*

The two specimens obtained were dried and turned brown.

Pennatulidæ (part.), *Milne-Edw. & Haime, Corall.* i.
Umbellulariadæ, *Gray, Synop. Brit. Mus.* 1840, p. 73; *Ann. & Mag. Nat. Hist.* 1859, iv. p. 440; *Dana, Zooph.* p. 598.

26. UMBELLULA.

The body free, umbellate, with a long stem and a single central axis; the upper part with a cluster of polype-bearing cells placed in concentric series, forming a large head. Axis square, elongate, as long as the stem of the coral.

Umbellula, *Cuvier, Tab. Elém.* p. 675.
Umbellularia, *Lamk. A. s. V.* ed. 2. ii. p. 381; *Gray, P. Z. S.*; *Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 25; *Dana, Zooph.* p. 598.
Les Ombellulaires, *Cuvier, R. A.* ed. 2. iii. p. 319.

67. Umbellula grœnlandica.

Zoophytaria grœnlandica, *Mylius, Grönl. Thierpfl.* 1753, 4to, with a plate.
Hydra marina arctica, *Ellis, Phil. Trans.* xlviii. p. 305 (Clustered Sea-Polype), t. 12; *Corall.* p. 96, t. 37.
Isis encrinus, *Linn. S. N.* ed. 10. n. 5.
Pennatula encrinus, *Pallas, Zooph.* p. 365; *Ellis & Solander*, p. 67.
Umbellularia grœnlandica, *Lamk. Syst.* p. 380; *A. s. V.* ed. 2. p. 381; *Dana, Zooph.* p. 598; *Esper, Pflanz.* iii. p. 366, t. 2.
Umbellula, *Cuvier, Tab. Elém.* p. 676.
Umbellularia encrinus, *Cuvier, R. A.* iii. p. ; *Ehrenb. C. R. M.*

Pallas refers to the existence of two specimens,—one in the collection of Mr. Peter Collinson, which was described by Ellis; the other, described by Mylius, in that of M. Hollmann, of Göttingen.

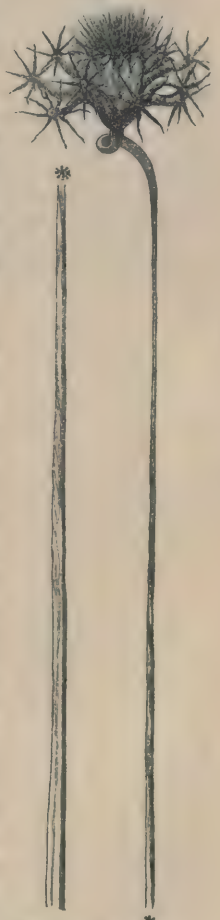
Umbellula grœnlandica was discovered by "Captain Adrians, of the English Greenland ship the 'Britannia,' a native of Jutland." Two specimens "were drawn up with the line, as they were sounding the sea, out of a clayish ground, 236 fathoms deep, that is, 1416 feet, in 79 degrees, north latitude, about 90 English miles from Greenland." "Each of the two plants was broken into three pieces, which accident, however, did not hinder me from laying it before me according to its compleat form and size." They were upwards of 6 feet in length.

The captain gave them to M. Dunze, of Bremen; and the latter gave one to M. Christlob Mylius, who described and figured it in a pamphlet entiled "An Account of a New Zoophyte," 8vo, 1754, and the other to Mr. Collinson, who transferred it to John Ellis, by whom it was described and figured in his work on Corallines. The specimen that belonged to Mylius was given by him to M. Hollmann, of Göttingen, according to Pallas's 'Zoophytes,' p. 366. What has become of Ellis's specimen is not known; it has probably been destroyed; and the specimen that was in M. Hollmann's collection in 1766 has not since been referred to.

No other specimens appear to have been discovered, which is very remarkable when we consider the number of ships that visit the northern seas, and the attention which the Danish, Norwegian, and Swedish naturalists (especially the former) have paid to the natural productions of the coast of Greenland.

All the accounts of the Coral in the more

Fig. 2.



Umbellula grœnlandica (6 feet long).

modern zoological works have been taken from Ellis's description and figure; there are some details in the previous account of Mylius which have been overlooked. He also gave a history of the discovery and the means by which the Coral came into his hands, which is entirely omitted by Ellis.—*Gray, Ann. & Mag. Nat. Hist.* 1860, v. p. 25.

This conduct of Ellis is the more remarkable, as we are told that M. Dunze, who gave the specimen to Mr. Collinson, and was in England at the time, lent M. Mylius's specimen to Ellis to examine the internal structure, as he did not like to open his own. Mylius proposed to call it *Asterias zoophytes composita* (*l. c.* p. 24). The tract is illustrated with a plate by "T. Kohler, ad viv. del. Lond."

De Blainville (Man. d'Act. p. 513), overlooking the fact that Mylius and Ellis examined two specimens, states that only a single specimen is known, and does not know where the specimen described by Ellis (whose description and figure has been copied by every one) came from.

See "An Account of a New Zoophyte or Animal Plant from Greenland, in a letter to Dr. Albert Haller, President of the Royal Society of Sciences at Göttingen, written in high German by Christlob Mylius, now translated into English. Priore tempore priore jure, London, 1754," 8vo, with a folio plate. (Dated London, Nov. 16, 1753.)

In hopes that it may induce naturalists to look for the animal, I have added (fig. 2, p. 39) a copy of the small figure given by Ellis.

27. CRINILLUM.

Crinillum, *Van der Hoeven, Konink. Akad. van Wetenschappen*, 1861, p. 280.

"Body elongate, slender; the axis long, quadrangular, four-grooved; polype-bearing branches five, lanceolate, terminal."

68. Crinillum Siedenburgii.

Crinillum Siedenburgii, *Van der Hoeven, l. c.*

Hab. Molucca Islands.

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69. Osteocella Cliftoni.

Mr. G. Clifton sent, many years ago, to the British Museum an elongate fusiform subcylindrical, white, smooth bone or axis, which is 10½ inches long, attenuated to a point at each end; but the attenuation is much more gradual and longer at one end than at the other; the thickest part is at about one-third of the entire length from the least attenuated end; the points are hornlike or semitransparent. It is labelled "The backbone taken out of the marine animal in bottle marked 'No. 1.' I caught him or it swimming with great rapidity in shallow water (*G. Clifton*)" (the bottle never reached the Museum). It has much the appearance of being the bone or axis of a *Pennatula*; but they hardly swim with great rapidity. It is probably from Australia, as there is an intelligent naturalist of the name of G. Clifton there who has sent to the Museum many interesting specimens, and collected many algæ for Dr. Harvey.

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British Museum (Natural History)
Dept. of Zoology
Catalogue of sea pens

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